33. Jahrestagung der Vereinigung für Kinderorthopädie e.V.

Vereinigung für Kinderorthopädie

22. – 23. März 2019, Düsseldorf

Hilton Düsseldorf

PROGRAMM

Inhaltsverzeichnis

Grusswort

Sehr geehrte Kolleginnen und Kollegen,
liebe Freundinnen und Freunde der Kinderorthopädie,

es ist uns eine große Freude, Sie zum zweiten Mal nach 2007 zur 33. Jahrestagung der Vereinigung für Kinderorthopädie nach Düsseldorf einzuladen.

Im Jahre 1987 trafen sich erstmalig 24 "Freunde der Kinderorthopädie" aus Deutschland, Österreich und der Schweiz und gründeten unsere Vereinigung. Seither nahm die Zahl der Kongressteilnehmer ebenso kontinuierlich zu wie die Anzahl der Mitglieder in unserer Fachgesellschaft. Dies zeigt einerseits, wie wichtig unser Fachgebiet und andererseits wie groß das Interesse an der Kinderorthopädie ist. Die Analyse, Begleitung und ggf. Lenkung von Wachstum und Entwicklung, Erkennen von möglichen Erkrankungen und Fehlformen sowie deren Abgrenzung von der Norm sind anspruchsvolle Aufgaben. Eine fundierte Ausbildung und kontinuierliche Fortbildung sind unabdingbar für unser gemeinsames Ziel: Gesunde Kinder, fit für Sport, Spiel und Bewegung sowie kontinuierliche Betreuung und Behandlung von Behinderten.

Wir möchten Ihnen einen interessanten Kongress zu Themen aus der gesamten Breite unseres Spezialgebietes bieten und hoffen auf lebhafte Diskussionen. Seien Sie ermuntert, besondere Fälle in den "How-to-treat"-Sitzungen zur Diskussion zu stellen. In traditionell freundschaftlicher Atmosphäre möchten wir viele neue Erkenntnisse zum Wohle unserer kleinen und größeren Patienten bieten und diskutieren.

Zugleich können Sie ihr kollegiales Netzwerk in persönlichen Gesprächen erweitern und vertiefen.

Wir freuen uns, Sie in Düsseldorf zur 33. Jahrestagung der Vereinigung für Kinderorthopädie begrüßen zu dürfen.

Univ.-Prof. Dr. R. Krauspe - Direktor der Klinik
Prof. Dr. B. Westhoff - Ltd. Oberärztin, Kinder-/Neuroorthopädie
Dr. C. Lederer - Assistenzärztin, Organisationsteam

Ort der Veranstaltung
Hilton Düsseldorf
Georg-Glock-Straße 20, D-40474 Düsseldorf

Wissenschaftliche Leitung
Prof. Dr. med. Rüdiger Krauspe
Prof. Dr. med. Bettina Westhoff
Orthopädische Klinik und Poliklinik
Universitätsklinikum Düsseldorf

Veranstalter der wissenschaftlichen Tagung
Vereinigung für Kinderorthopädie e.V. (VKO)
Straße des 17. Juni 106-108
D-10623 Berlin

Vereinigung für Kinderorthopädie

Veranstalter der Industrieausstellung und des Rahmenprogramms
Akademie Kinderorthopädie GmbH
Straße des 17. Juni 106-108
D-10623 Berlin

Anmeldung, Kongressorganisation und Informationen
Kongress- und MesseBüro Lentzsch GmbH
Gartenstraße 29, D-61352 Bad Homburg
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info@kmb-lentzsch.de / www.kmb-lentzsch.de

Allgemeine Informationen

Anfahrtswege zum Hilton Dusseldorf

Öffentliche Verkehrsmittel:
Vom Hauptbahnhof mit der U78 oder U79 in Richtung Messe/Rheinstadion oder Duisburg bis Haltestelle Theodor-Heuss-Brücke. Nach rechts aussteigen und zurück bis zur Georg-Glock-Strasse. Der Georg-Glock-Strasse für 250m folgen. Das Hilton Dusseldorf befindet sich auf der linken Seite.

aus Richtung Dortmund-Essen:
Folgen Sie der A52 bis zur Ortseinfahrt Düsseldorf. Biegen Sie rechts ab in Richtung Messe. Halten Sie sich rechts und fahren Sie nicht durch den Tunnel. An der Kreuzung biegen Sie links unter der Überführung ab. Dann rechts abbiegen in die Georg-Glock-Strasse.

aus Richtung Köln-West:
A57 bis Kreuz Kaarst, A52 nach Düsseldorf in Richtung Flughafen über die Theodor-Heuss-Brücke. Ordnen Sie sich auf der Brücke rechts ein, und biegen Sie vor dem Tunnel rechts ab. Dann biegen Sie rechts auf den Kennedydamm und wieder rechts in die Georg-Glock-Strasse.

aus Richtung Köln-Ost:
A3 bis Kreuz Hilden, dann auf die A46. Verlassen Sie die A46 an der Anschlußstelle Düsseldorf-Universität in Richtung Innenstadt. Folgen Sie der Corneliusstrasse geradeaus über die Berliner Allee, Kaiserstrasse weiter bis zum Kennedydamm. Biegen Sie nicht rechts ab, sondern folgen Sie den Bahnschienen geradeaus in die Kaiserswerther Strasse. Biegen Sie die zweite Strasse rechts in die Georg-Glock-Strasse ab.

aus Richtung Krefeld / Moers:
A57 Richtung Köln bis Kreuz Kaarst dann wie aus Köln-West

aus Richtung Aachen:
A46 bis Neuss, A57 in Richtung Krefeld bis Kreuz Kaarst dann wie aus Köln-West

aus Richtung Venlo / Mönchengladbach
A61 bis Mönchengladbach, A52 Richtung Düsseldorf dann wie aus Köln-West

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Flughafen – Hilton Düsseldorf
Mit dem Bus Linie SB 51 oder 721 ab Flughafen Terminal A/B/C zur Haltestelle „Nordfriedhof", 6 Minuten Fußweg zum Hilton

Teilnahmegebühren

Teilnehmer	210,00 €
Erstgenannte Referenten	170,00 €
Erstgenannte Posterautoren	190,00 €
Studenten / Physiotherapeuten / Assistenzberufe *	110,00 €

* Nachweis erforderlich

Homepage
www.kinderorthopaedie.org

Zertifizierung
Die Ärztekammer Nordrhein hat die Tagung mit insgesamt CME-8 Punkten zertifiziert.

Die wissenschaftlichen Leiter und die Referenten bestätigen die Produktneutralität des Programms und der Vorträge. Evtl. Interessenskonflikte werden bei der Veranstaltung bekanntgegeben.

Haftung
Die Akademie Kinderorthopädie GmbH tritt in jedem Falle nur als Vermittler auf und haftet nicht für Verluste, Unfälle oder Schäden an Personen und Sachen, gleich welchen Ursprungs. An allen Ausflügen, Touren usw. beteiligt sich der Reisende auf eigene Gefahr. Mündliche Nebenabsprachen sind unverbindlich, sofern sie nicht schriftlich bestätigt werden.

Einverständnis zu Foto- und Videoaufnahmen
Wir weisen darauf hin, dass zur Dokumentation der Veranstaltung inkl. der Fachausstellung Foto- und Videoaufnahmen gefertigt werden. Die Aufnahmen dienen zu Informations- und Werbezwecken der Veranstalter und zur Berichterstattung rund um den Kongress auf der Website und in Broschüren. Mit dem Besuch der Kongressveranstaltung inkl. des Gesellschaftsabends erklären Sie sich mit der Verwendung der Aufnahmen einverstanden sofern Sie dem Fotografen nicht ausdrücklich widersprechen. Ein Vergütungsanspruch besteht nicht.

Hinweis für Referenten
Die Referenten werden gebeten, Ihre Beiträge mindestens eine Stunde vor Sitzungsbeginn in der Medienannahme abzugeben. Format 16:9.

Teilnahmebestätigung
Ihre Tagungsunterlagen erhalten Sie am Tagungscounter.

Öffnungszeiten des Tagungsbüros:

Freitag, 22.03.2019	11:00 – 18:00 Uhr
Samstag, 23.03.2019	07:15 – 16:15 Uhr

Gesellschaftsabend

Freitag, 22. März 2019, 19:30 Uhr
Gesellschaftsabend, Kostenbeitrag: 75,00 €
Schulstr. 11, 40213 Düsseldorf

maxhaus
KATHOLISCHES STADTHAUS
IN DÜSSELDORF

Im Jahr 1805 erteilt Papst Pius VII. die Vollmacht zur Errichtung der heutigen Pfarrei St. Maximilian – die neue Namenswahl orientiert sich am Namenspatron des Kurfürsten Maximilian Joseph. Heute ist das Maxhaus ein faszinierender Ort im Herzen Düsseldorfs mit moderner Architektur unseres Jahrhunderts.

Anreise: Hilton Düsseldorf – Maxhaus
8 Minuten Fußweg zur U-Bahn Station Golzheimer Platz,
4 Stationen mit der U78 oder U79 zur Heinrich-Heine-Allee,
400 m / 5 Minuten Fußweg zum Maxhaus

12:30 - 13:15 Firmensymposien
BioMarin Deutschland GmbH (Rheinlandsaal A)
NuVasive Germany GmbH (Platon 2)

13:30 - 13:40 Begrüßung

13:40 - 14:40 Klinikpräsentation: Kinderorthopädie interdisziplinär

Der Zehenspitzengang
B. Westhoff, A. Horn; Düsseldorf

Der unklare Knochenschmerz
B. Bittersohl, A. Borkhardt; Düsseldorf

Das dicke Gelenk
R. Krauspe, P. Oommen; Düsseldorf

14:40 - 15:30 V1 Wirbelsäule
Vorsitz: R. Krauspe, Düsseldorf, U. von Deimling, St. Augustin

14:40 - 14:50 V1-1 / 7+3 Parental Internet Search in the field of Pediatric Orthopaedics – Results from a prospective, controlled study
C.-D. Peterlein, M. Bosch, S. Fuchs-Winkelmann; Marburg

14:50 - 15:00 V1-2 / 7+3 Serial Casting for Early Onset Scoliosis – Results
K. Mladenov, T. Ballhause, P. Kunkel, C. Hagemann, R. Stücker; Hamburg

15:00 - 15:10 V1-3 / 7+3 Long-term treatment of pediatric scoliosis in spinal muscular atrophy (SMA) with externally controlled magnetic implants
H. M. Lorenz, M. M. Hecker, B. Badwan, L. Braunschweig, K. Tsaknakis, A. K. Hell; Göttingen

15:10 - 15:20 V1-4 / 7+3 Outcome of spondylodesis for spinal muscular atrophy (SMA) patients with or without prior surgical intervention
A. K. Hell, M. M. Hecker, L. Braunschweig, K. Tsaknakis, H. M. Lorenz; Göttingen

Wissenschaftliches Programm – Freitag

15:20 - 15:30 V1-5 / 7+3 Vertebral column resection (VCR) for most severe Kyphotic Deformities in Children
R. Stücker, K. Mladenov, C. Hagemann, P. Kunkel; Hamburg

15:30 - 16:00 Pause

16:00 - 17:00 V2 Hüfte, Neuroorthopädie
Vorsitz: B. Westhoff, Düsseldorf, T. Kraus, Graz

16:00 - 16:10 V2 -1 / 7+3 Epiphysiolisis capitis femoris: a literature review comparing pinning in situ, extracapsular osteotomies (Imhäuser/Southwick) and modified Dunn osteotomy.
N. Guindani, F. F. Fernandez, O. Eberhardt, T. Wirth, M. De Pellegrin; Bergamo, Stuttgart, Mailand

16:10 - 16:20 V2 -2 / 7+3 Pincer Impingement: acetabular or pelvic deformity?
V. Frimberger, B. Heimkes; München

16:20 - 16:30 V2 -3 / 7+3 PFFD – Results and complications with LCP for proximal femoral valgisation
S. Brosseder, M. Kröner, S. Nader; Vogtareuth

16:30 - 16:40 V2-4 / 7+3 Modelling of EMG signals to develop ergometer based rehabilitation training for patients with Cerebral palsy
S. Roy, A. Alves-Pinto, F. Mayerle, R. Lampe; München

16:40 - 16:50 V2-5 / 7+3 The orthotic effect of functional electrical stimulation on the improvement of 3-dimensional foot motion during walking in children with cerebral palsy
H. Böhm, C. Dussa; Aschau im Chiemgau

16:50 - 17:00 V2-6 / 7+3 Multilevel contracture release has an additive effect to glucocorticoid treatment in Duchenne patients
A. Rakow, C. Weiß, C. Stoltenburg, S. Lebek, J. Funk; Berlin

17:00 - 18:00 V3 How-to-treat Fallvorstellungen
Vorsitz: R. Stücker, Hamburg, R. Ganger, Wien

17:00 - 17:09 V3-1 (3+6) Pterygium des Arms – Eine Fallvorstellung
F. Thaller, A. Bardas, C. U. Dussa; Aschau im Chiemgau

17:09 - 17:18 V3-2 (3+6) Eine seltene Ursache einer rezidiven Varusfehlstellung des Kniegelenkes
F. Meister, C. U. Dussa; Aschau im Chiemgau

17:18 - 17:27 V3-3 (3+6) Spina bifida occulta mit tethered cord und Wirbelkörperdeformität – Ein 3 Jahres Verlauf
C. Krieter; Mannheim

17:27 - 17:36 V3-4 (3+6) Femorale Raumforderung bei Williams-Beuren Syndrom
I. Zommers, M. Rogalski, M. Deja; Berlin

17:36 - 17:45 V3-5 (3+6) Schwerer sek. Pes valgus bei V.a. kongenitale Fibulapseudarthrose
S. Utzschneider; München

17:45 - 17:54 V3-6 (3+6) Partieller Gigantismus der Füße – Operatives Konzept?
B. Westhoff, R. Krauspe; Düsseldorf

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08:00 - 09:30 Mitgliederversammlung Vereinigung für Kinderorthopädie

09:30 - 10:15 Gastvortrag: Vladimir Kenis
Congenital clubfoot – Nikolai Pirogoff's contribution: Lessons from history

10:15 - 10:30 Wissenschaftspreis

10:30 - 11:00 Pause

AK-Sitzung Niedergelassene Orthopäden (Leibnitz 3)
AK-Sitzung „Junge Plattform" (Aristoteles 1)

11:00 - 12:00 Beste Vorträge / Beste Poster
Vorsitz: R. Rödl, Münster, S. Utzschneider, München

11:00 - 11:10 V Beste Vorträge -01 / 7+3
Perthes disease – Possible psychological effects and strategies for interventions
C. Haas, K. Remmel, K. Wedlich; Eichstätt, Nürnberg, München

11:10 - 11:20 V Beste Vorträge -02 / 7+3
Compensatory mechanisms in children with lower extremity internal rotational malalignment during walking and running
S. K. Byrnes, D. Kunic, R. Rethwilm, H. Böhm, C. Dussa; Aschau im Chiemgau

11:20 - 11:30 V Beste Vorträge -03 / 7+3
Prospective study on the health effects of smartphone usage on the cervical spine in schoolchildren
C. T. Baltin, S. Heyer, D. Grevenstein, J. Bredow, A. Yagdiran, P. Eysel; Köln

11:30 - 11:36 V Beste Poster -01 / 3+3
Development of a Symmetry Score for Infantile Postural and Movement Asymmetries: Preliminary Results of a Pilot Study
H. Spittank; Münster

11:36 - 11:42 V Beste Poster -02 / 3+3
Possible adverse events in children treated by manual therapy – A review of the current literature
H. Spittank; Münster

11:42 - 11:48 V Beste Poster -03 / 3+3
Immobilization after hip reconstruction in children – A need for new techniques?
L. Pisecky, M. Klotz, T. Gotterbarm; Linz

12:00 - 12:05 Vorstellung Kongress 2020; Team Graz

12:05 - 13:05 V4 Wuchslenkung, Varia
Vorsitz: T. Dreher, Zürich, A. Meurer, Frankfurt am Main

12:05 - 12:15 V4 -1 / 7+3 Treatment of Ankle Valgus through Hemiepiphysiodesis of the Distal Medial Tibia
A. Herzog, F. Fernandez, T. Wirth; Stuttgart

12:15 - 12:25 V4-2 / 7+3 Permanent epiphyseodesis around the knee using a canullated bone trephine – A preliminary report
J. N. Bröking, R. Rödl, G. Gosheger, B. Bröking, A. Frommer, G. Toporowski, A. Rachbauer, A. Laufer, B. Vogt; Münster

12:25 - 12:35 V4-3 / 7+3 Automated Versus Manual Greulich-Pyle Method for Bone Age Prediction in Patients with Lower Limb Reduction Defects – Is there any Difference? – A Retrospective Study
H. Forkl, F. K. Afifi, S. Marx, S. Nader; Vogtareuth

12:35 - 12:45 V4-4 / 7+3 New standard radiographic reference values for proximal fibular height in skeletally immature girls and boys and critical evaluation of the need for concomitant proximal fibular epiphysiodesis when performing proximal tibial epiphysiodesis
A. Frommer, M. Niemann, G. Gosheger, J. N. Bröking, A. Laufer, A. Rachbauer, G. Toporowski, R. Rödl, B. Vogt; Münster

Wissenschaftliches Programm – Samstag

12:45 - 12:55 V4-5 / 7+3 3-dimensional deformity reconstruction of the lower limbs by multilevel correction osteotomies and intramedullary nailing in adolescents with heriditary hypophosphatemic rickets
G. Toporowski, R. Rödl, G. Gosheger, J. N. Bröking, A. Frommer, A. M. Laufer, A. Rachbauer, B. Vogt; Münster

12:55 - 13:05 V4-6 / 7+3 Osteochondritis dissecans shows a severe course and poor outcome in patients with juvenile idiopathic arthritis – A matched pair study of 22 cases
H. Kubo, H. Pilge, T. Oommen, M. Hufeland, P. Heusch, B. Westhoff, R. Krauspe; Düsseldorf

13:05 - 14:30 Pause

13:30 - 14:15 Firmensymposien
NuVasive Germany GmbH (Platon 2)
KYOWA KIRIN GmbH (Rheinlandsaal A)
Pharm-Allergan GmbH (Aristoteles 1)

13:15 - 14:15 AK-Sitzung „Kindliche Wirbelsäule“ (Leibnitz 3)

14:30 - 15:15 V5 How-to-treat Fallvorstellungen
Vorsitz: T. Wirth, Stuttgart, F. Thielemann, Dresden

14:30 - 14:39 V5-1 (3+6) Groteske knöcherne Deformierungen bei progressiver, immobilisierender Osteoporose eines 12-jährigen, männlichen, eineiigem Zwilling
A. Yagdiran, M. Rehberg, H. Hoyer-Kuhn, K. Zarghooni, C. Baltin, P. Eysel, E. Schönau, J. O. Semler; Köln

14:39 - 14:48 V5-2 (3+6) Zwei Kinder mit isolierter bilateraler Tibiahemimelie
H. Raddatz, W. Mittelmeier, S. Fröhlich; Rostock

14:48 - 14:57 V5-3 (3+6) Management intramedullärer Defekt distale Tibia bei Z.n. transepiphysär intraartikulär perforierter chron. Osteomyelitis
C. Lederer, B. Westhoff, R. Krauspe; Düsseldorf

14:57 - 15:06 V5-4 (3+6) Zunehmende einseitige Varusdeformität eines Vier-jährigen mit atypischem Morbus Blount – Teil II
D. Herz, J. Raabe, U. Seeberger, C. Bollmann; Arnstadt

15:06 - 15:15 V5-5 (3+6) Hochgradige patellofemorale Dysplasie mit lateralisierter hypoplastischer Patella und Genua vara
C. Bollmann, J. Raabe, U. Seeberger, D. Herz; Arnstadt

15:15 - 16:15 V6 Unterschenkel, Fuß
Vorsitz: R. Placzek, Bonn, A. Hell, Göttingen

15:15 - 15:25 V6 -1 / 7+3 Effect of tibial derotation osteotomy on gait deviations in patients with isolated increased tibial torsion
N. Alexander, K. Studer, H. Lengnick, E. Payne, H. Klima, R. Wegener; St. Gallen

15:25 - 15:35 V6-2 / 7+3 SUPER Ankle Procedure for Paley Type 3 b and c Fibular Hemimelia – Mid term results
K. Mladenov, R. Stücker, K. Ridderbusch; Hamburg

15:35 - 15:45 V6-3 / 7+3 Do the Overcorrected clubfeet due to different causes show similar characteristics?
C. U. Dussa, H. Böhm, L. Döderlein, A. Fujak; Aschau im Chiemgau, Wiesbaden, Erlangen

15:45 - 15:55 V6-4 / 7+3 The influence of subtalar arthroereisis on ankle range of motion: Implications for implant removal
R. Rethwilm, H. Böhm, C. Dussa; Aschau im Chiemgau, Innsbruck

15:55 - 16:05 V6-5 / 7+3 Outcome after subtalar arthroereisis in children with flexible flatfoot depends on time of treatment: Midterm results of 95 cases
H. Kubo, B. Westhoff, H. Pilge, C. Lipp, M. Ruppert, M. Hufeland, R. Krauspe; Düsseldorf

16:05 - 16:15 V6-6 / 7+3 Radiologic outcome over time in the treatment of pediatric flexible flatfeet with a Calcaneo-Stop screw
G. T. Mindler, S. Kolamkuzhiyil, C. Radler, R. Ganger, A. Kranzl; Wien

ab 16:15 Verabschiedung

P01
Oberlin's transfer to induce active elbow flexion in selected cases of arthrogryposis multiplex congenita type 1
C. Hagemann, R. Stücker, P. Kunkel; Hamburg

P02
Epiphyseodesis of the distal Femur to correct the flexion deformity of the knee joint
C. U. Dussa, V. Maestri, L. Döderlein, H. Böhm; Aschau im Chiemgau, Wiesbaden

P03
Orthopaedic diseases in childhood in art
K. Milachowski; München

P04
Recurrent Equinus deformity following calf muscle lengthening in cerebral palsy.
C. U. Dussa, M. Göggel, F. Meister; Aschau im Chiemgau

P05
10 Year Functional Gait Outcomes after Single-Event Multilevel Surgery in Children with Cerebral Palsy
N. Hasler, R. Visscher, M. Freslier, N. Singh, R. Brunner, E. Rutz; Basel, Zürich

P06
A severe flatfoot deformity following the correction of a cavus deformtiy in cerebral palsy
F. Meister, C. U. Dussa; Aschau im Chiemgau

P07
Analysis of the incidence of focal periphyseal edema (FOPE)
M. Ban, J. Wansch, R. Biedermann, I. Dornauer, D. Junker, B. Sztankay
Innsbruck, Hall in Tirol

P08
Dysfunctions of the upper cervical spine – The extraordinary role of atlas and axis in the development of our kids. Science? Fiction?
H. Spittank; Münster

P09
Mucopolysaccharidosis Type VI as rare cause of joint pain
in an 8 year old girl.
U. W. Grün; Homburg (Saar)

P10
Orthopedic care of adults with mental and/or multiple disabilities
in Germany: First experiences of our MZEB
B. Schnuck, F. Bösebeck; Rotenburg (Wümme)

P12
Limb lenghthening and reconstrucion with intramedullary motorized
lengthening nails in skeletally immature patients
A. Frommer, R. Rödl, G. Gosheger, J. N. Bröking, A. Laufer, A. Rachbauer,
G. Toporowski, B. Vogt; Münster

P13
Fibula-assisted segmental Bone Transport in the treatment of adamantinomas
A. Rachbauer, R. Rödl, G. Gosheger, N. Bröking, A. Frommer, A. Laufer,
G. Toporowski, B. Vogt; Münster

P14
94% achieved distraction length following externally controlled magnetic
rod distraction for treatment of pediatric spinal deformity
H. M. Lorenz, L. Braunschweig, K. Tsaknakis, J. Grote, A. K. Hell; Göttingen

P15
Primary scoliosis correction in childhood and adolescence due to
the initiation of brace therapy
K. Tsaknakis, L. Braunschweig, H. M. Lorenz, A. K. Hell; Göttingen

P16
Changes of vertebral and disk morphology following treatment with
magnetically controlled growing rods
S. Stücker, P. Kunkel, C. Hagemann, K. Mladenov, R. Stücker; Hamburg

P17
Bilateral idiopathic chondrolysis of hip in a adolescent patient
E. Schumann, F. B. Kübler, C.-E. Heyde, A. Roth; Leipzig

P18
Fulminant course of septic coxitis with Panton Valentine Leukocidin-producing
methicillin resistant Staphylococcus aureus (MRSA) in a 14 year old boy
M. Reinke, K. Studer, V. Exler, E. Payne, H. Klima, A. Niederer, C. Kahlert,
H. Lengnick; St.Gallen

P19
The Greater Trochanter Apophysitis - A rare but typical Entity
in the Adolescent Athlete
H.-J. Hellmich, R. Brunner, A. Krieg; Basel

P20
Pediatric septic hip. Arthrotomy or repeated aspiration-lavage.
Which is better? A multifactorial Analysis
E. Cohen, B. Mazilis, Y. Klasov; Beer Sheva

P21
Use of Tutobone xenograft for Dega pelvic osteotomy in children
with cerebral palsy
N. Stiel, M. Moritz, F. von Sivers, R. Stücker, A. Spiro; Hamburg

P22
Surgical treatment of tibial hemimelia with fibula-pro-tibia operation
and foot correction
M. Bajic; Vogtareuth

P23
Neglected clubfoot – Extreme Lambrinudi Arthodesis with
a Double Incision
A. Helmers, M. Axt; Berlin, Sidney

P26
Short term follow-up of fixation of unstable osteochondritis dissecans and
osteochondral lesions with biodegradable magnesium pins
O. Jungesblut, M. Moritz, J. Berger-Groch, R. Stücker, M. Rupprecht; Hamburg

P27
Internal fixation of fractures, osteochondral fragments and for
osteotomies using biodegradable magnesium screws
M. Moritz, O. Jungesblut, R. Stücker, M. Rupprecht; Hamburg

P28
Is the intraoperative amount of derotation in patients with torsional deformities of the tibia reflected in gait analysis?
F. Unglaube, A. Kranzl, R. Ganger; Wien

Beste Poster

V Beste Poster -01 / 3+3
Development of a Symmetry Score for Infantile Postural and Movement Asymmetries: Preliminary Results of a Pilot Study
H. Spittank; Münster

V Beste Poster -02 / 3+3
Possible adverse events in children treated by manual therapy – A review of the current literature
H. Spittank; Münster

V Beste Poster -03 / 3+3
Immobilization after hip reconstruction in children – A need for new techniques?
L. Pisecky, M. Klotz, T. Gotterbarm; Linz

Eine elektronische Präsentation der eingereichten Poster finden Sie im Foyer.

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12.30 - 13.15 Uhr
Firmensymposium BioMarin Deutschland GmbH
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Bemerkenswerte Fälle in der Kinderorthopädie: Skelettale Anomalien verursacht durch angeborene Stoffwechselerkrankungen
C. Lampe (Gießen)

12.30 - 13.15 Uhr
Firmensymposium NuVasive Germany GmbH
(Platon 2)
Das PRECICE-System: Back to the Basics
M. Langendörfer (Stuttgart), B. Vogt (Münster)

Firmensymposien – Sa., 23.03.2019

13.30 - 14.15 Uhr
Firmensymposium NuVasive Germany GmbH
(Platon 2)
Der proximale Femur: Ein Hands-on Workshop
R. Krauspe (Düsseldorf), T. Dreher (Zürich)

13.30 - 14.15 Uhr
Firmensymposium KYOWA KIRIN GmbH
(Rheinlandsaal A)
Fortschritte in der medikamentösen Therapie und Update der operativen Therapie des Phosphatdiabetes
M. Rehberg (Köln), R. Rödl (Münster)

13.30 - 14.15 Uhr
Firmensymposium Pharm-Allergan GmbH
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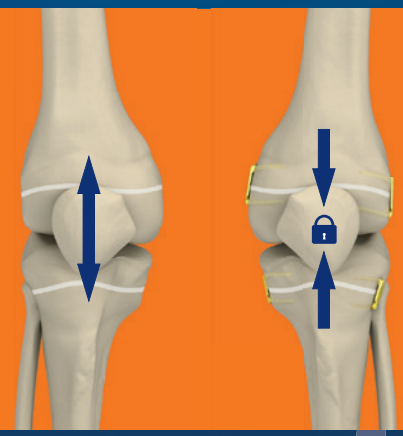

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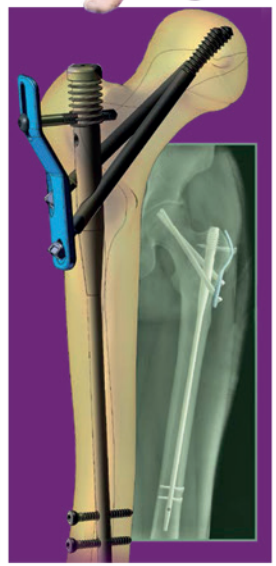

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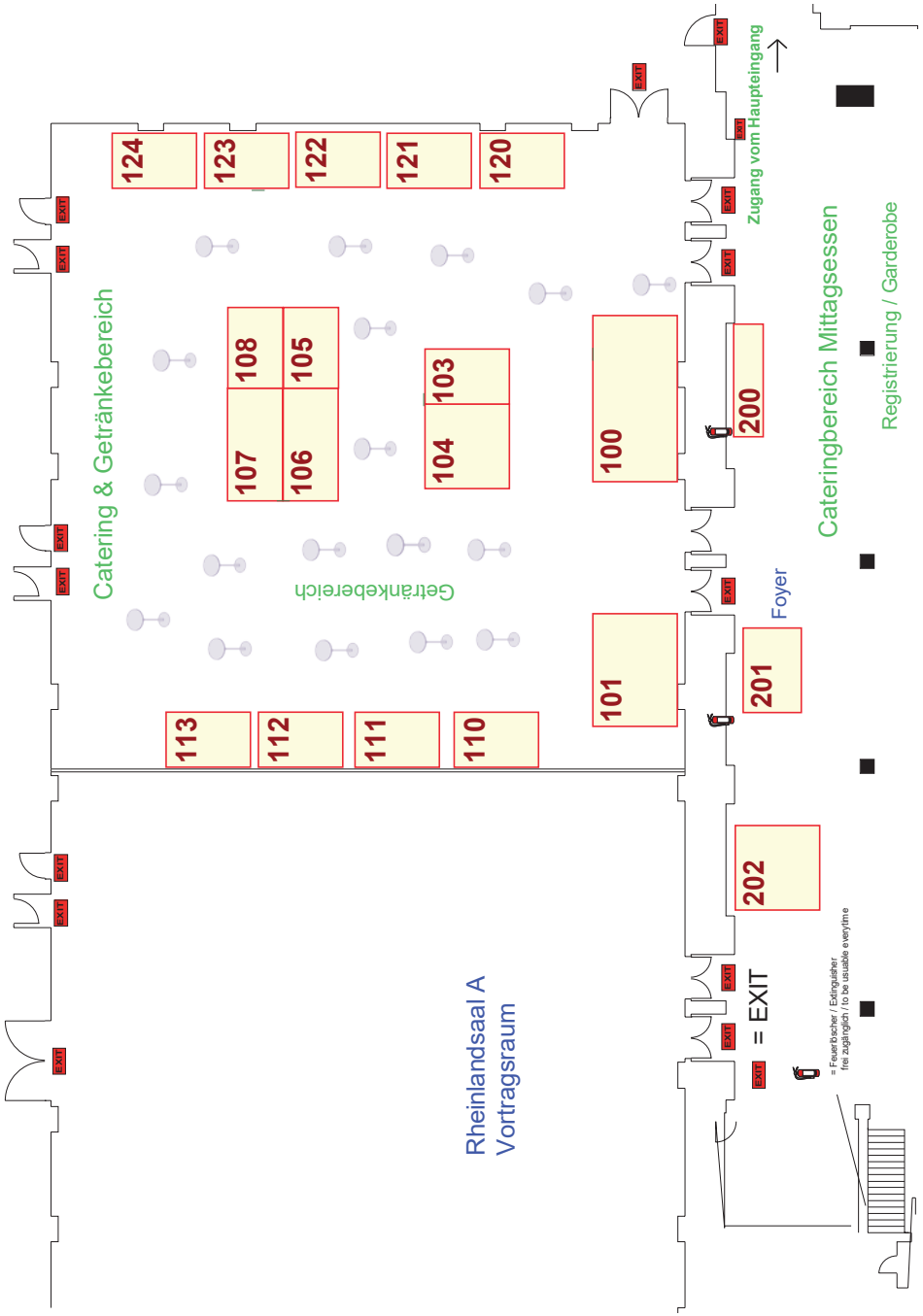


Abstracts

Beste Vorträge/Beste Poster

Beste Vorträge-1

Morbus Perthes – potentielle psychologische Auswirkungen und Interventionsstrategien

C. Haas, K. Remmel, K. Wedlich

Questions Perthes disease is an avascular osteonecrosis of the femoral head and the 2. common hip condition seen in childhood, which can be treated either conservatively or surgical with the aim to preserve a good Containment & a natural joint function as much as keeping the patient painless. The treatment can switch from conservatively to surgical, the result beeing frequently uncertain. The children have to accept serious restrictions in the course of the disease. The key issue of the work refers to the practically unknown psychological effect of the Perthes disease on children and their families.
Furthermore potential approaches are beeing illuminated finding a way to counter the strain.
Methods Out of 48 patients beeing treated within the last 3 years, 15 children were followed up with a qualitative, partly structured compendium interview via telephone. The group consisted of 9 boys and 6 girls. At the point of gathering the average age came up to 10,4 years (beginning of the disease at the age of 6). 1/3 of the children were treated conservatively, the other 10 cases had to undergo at least 1 operation. To structurize the evaluation 4 main categories were built:
Severity of the disease (1), effect and strain arising from the disease (2), the psychosocial environment (3), issues concerning the handling of the disease.
Those again were divided into subcategories generated by the summaries of the accompanied codes.
Results Those children in particular suffered from the limitation of their exercises, which mostly reflected in relation to their hobbies. The parents felt the strain seeing their children suffering without beeing able to help them. In addition they had to force the measures of the treatment.In comparison to the children the disease represented the greater strain for the parents.
The expenditure of the upbringing increased by a multiple due to the constant observation of the young patients and the permanent reduction of their activities. Described by the parents as further crucial strains were the great uncertainty and the fear.
Conclusion We were able to demonstrate the strain the families are confrontated with and find possible approaches to start interventions and improvements, though there would be follow-up studies necessary with a higher case number. As part of the intervention a family therapy, coaching of the communication skills and as the improved networking of the treating physicians could apply.
The cooperation of psychologists physicians and social workers is essential to do justice to such difficulties.

Beste Vorträge-2

Kompensationsmechanismen beim Gehen und Rennen bei Kindern mit Innenrotationsfehlstellungen der Tibia und des Femurs

S. K. Byrnes, D. Kunic, R. Rethwilm, H. Böhm, C. Dussa

Questions Not all children with lower extremity internal rotational malalignment (IRM) present an in-toeing gait [1]. However, most children with IRM seek consultation of orthopedic specialists due to noticeable in-toeing gait. The risk of tripping may be higher for these

patients. The aim of this study was to determine compensatory mechanisms during walking and running. We hypothesized that children with IRM have 1) higher ankle dorsiflexion, knee flexion and hip flexion to facilitate toe clearance 2) greater step width, external rotation of the femur and pelvis to avoid tripping over the contralateral leg 3) increased compensatory mechanisms while running.

Methods Sixty-four patients between 5–17 years with idiopathic IRM were retrospectively included and subdivided into three groups: 22 patients with internal tibial torsion (ITT), 28 patients with internal femoral torsion (ITF) and 14 patients with both (ITB). Passive hip rotation and tibial torsion were measured in prone position with 90° knee flexion by hand-held goniometer. Internal malalignment of tibia and femur torsion was at least 1 SD different from healthy children (< 17° tibial torsion; >13° internal hip midpoint of rotation). Thirty-six healthy age-matched children were analyzed for comparison. Three-dimensional gait data was captured using a Vicon camera system. Two factor ANOVA and post-hoc t-tests were performed for significant differences and effects (P<.01).

Results Fifty-three patients (83%) showed more than 1 SD greater internal foot progression angle (FPA) during walking compared to healthy controls. All torsional groups had significant greater step width and more internally rotated mean FPA in stance during walking and running than healthy children, but did not increase while running. All patients had greater peak ankle dorsiflexion in swing phase only during running compared to healthy children. Only the ITT group had significant external hip rotation during walking, but not during running.

Conclusion The internal FPA could not be compensated. Other compensatory mechanisms, such as greater ankle dorsiflexion during running and greater step width were found in patients with IRM to prevent them from tripping. For active patients, especially, greater ankle dorsiflexion while running could result in overuse of dorsiflexor muscles that may cause shin splints.

[1] Radler et al. Gait & Posture 32 (2010) 405–410.

Beste Vorträge-3

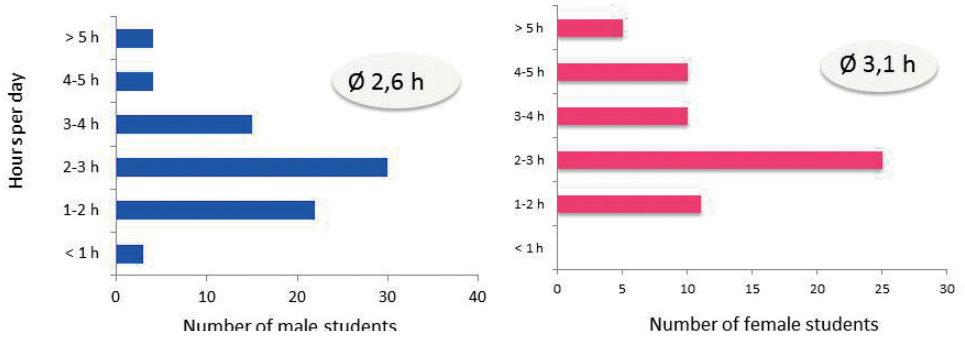
Prospektive Studie über die gesundheitlichen Auswirkungen der Smartphone-Nutzung auf die Halswirbelsäule am Beispiel von Schulkindern

C. T. Baltin, S. Heyer, D. Grevenstein, J. Bredow, A. Yagdiran, P. Eysel

Questions The use of a smartphone has taken a central position in our everyday lives. Even younger generations in their growing age are using this device more and more often. The purpose of this study is to investigate the extent to which the use of smartphones in schoolchildren correlates with cervical discomfort. Factors such as general physical activity, flexibility and strength of the spine, as well as socio-demographic aspects are taken into account.

Methods In this prospective study, a total of 139 schoolchildren between the ages of 11 and 18 were examined. A questionnaire was used to analyze the different smartphone usage patterns and the neck disablity index (NDI). Licensed Tergumed® devices were used to record the current force situation and spinal mobility using SpinalMouse® and Mobee®. The first investigation phase was carried out from August 2017 to February 2018. Currently the first follow-up takes place after one year, further follow-ups are planned for the next years.

Results In the first phase of the study, a total of 78 male and 61 female students participated (mean age: 14.7 years). Most students use the smartphone for 2 to 3 hours a day (40%), averaging 2.8 hours (compare Fig. 1).



Smartphone usage per day

In the NDI, 35% of all students score more than 4 points, showing slight clinically relevant impairments. After prolonged use of the smartphone, the schoolchildren complain in particular about neck pain (66%), headache (53%) and eye pain (50%). Spearman's correlation analysis revealed no significant correlation between the force values of the cervical spine (Tergumed®) and the extent of movement of the cervical spine (Mobee®) and the NDI.

Conclusion The results of this study show the status quo of the current smartphone usage, the complaints based on the NDI and the strength and mobility of the spine of the schoolchildren. It could be demonstrated that already about 1/3 of all schoolchildren suffer from neck pain and show muscular imbalances of the neck muscles.

In the follow-up of this study, the relationship as well as further development of the health effects on the cervical spine will be analyzed. Problem areas could thereby be identified more clearly and counteracted by specific measures (e.g. muscular training, usage recommendations, etc.).

Beste Poster-1

Die Entwicklung eines Symmetrie-Scores zur Erfassung infantiler Haltungs- und Bewegungsasymmetrien: Vorläufige Ergebnisse einer Pilotstudie

H. Spittank

Questions Although variable positional, postural, and movement asymmetries are considered to be indications of a developing physiological postural motor system, constant early childhood asymmetries of head or body posture, spontaneous movement, or muscle tone are mostly expressions of abnormal sensory-motor coordination and require diagnosis and, if necessary, treatment. The term "kinematic imbalance due to suboccipital strain (KISS)", and the concept behind, is widely accepted. The purpose of this study was to develop and verify a quantifiable symmetry score for infantile postural and movement asymmetries.

Methods Three studies were conducted. For reliability reasons, 6 test items examining postural and movement asymmetries, which came under consideration, were investigated in 24 infants with postural abnormality (range: 14–24 weeks). The inter-rater reliability was chosen as the primary endpoint. Furthermore, intrarater reliability and test-retest reliability were determined. Analysis and weighting of the items were performed by calculating the intraclass correlation coefficient. The validity was reviewed by expert opinion and by using a study with 26 infants (range: 12–28 weeks) of a cross-section population. The pilot study involved 38 infants, aged 14 to 24 weeks, who were examined using video. Their autonomic symptoms were recorded, and subsequently, they were treated once by means of manual medicine. The parents were instructed to a daily home program that focused on "tummy time."

Results The reliability tests led to a 4-item symmetry score with a point value between 4 points (very symmetrical) and 17 points (very asymmetrical). The chosen items achieved an intraclass correlation coefficient N0.8 and Cohen's κ? N0.6, respectively. The experts' opinions matched mainly to a majority agreement (N50%). Furthermore, a comparison between the outcome of clinical testing and the symmetry score applied to 26 children without diagnosed abnormalities displayed an agreement of 84.6%. The pilot study showed a good reduction of the postural and movement abnormalities because 63% of the manual treated children were assessed as being symmetric afterward.
Conclusion The reliable and valid 4-item symmetry score served for the diagnosis, evaluation, and follow-up of infants aged 3 to 6 months with infantile postural and movement asymmetries. The results of a pilot study showed the positive effect of a single manual medical treatment session along with a home program focusing on "tummy time."

Beste Poster-2

Mögliche unerwünschte Ereignisse bei Kindern, die mittels manueller Therapie behandelt wurden – eine Überprüfung der aktuellen Literatur und eine zusammenfassende Übersicht

H. Spittank

Questions Pediatric manual therapy/manual medicine (MT) is still discussed controversial within the medical community due to reported adverse events. MT is commonly used by different medical and non-medical professions such as chiropractors and osteopaths and different therapeutic forms are existing. MT interventions range from light touches, massage, mobilisation, pulse techniques and high velocity spinal manipulation. However, current evidence related to adverse events associated with MT is not well understood and hard to research.
The aim is to update the clinical research literature on possible adverse events in children treated by spinal manipulation from the year 2010 up to now.
Methods Review of the clinical research literature from January 2010 until January 2018 as reported in MEDLINE, PubMed and PubMed Central for adverse events specifically related to the treatment of pediatric cases by manual therapy.
Results Four "new" clinical studies, two systematic review with meta-analysis and two reports were identified. Three clinical studies reported on chiropractic care and one on osteopathic spinal manipulation in children. The systematic review investigated all studies of adverse events and manual therapy and was not specific for pediatric patients. The two evidence reviews focused on effectiveness of spinal manipulation in a variety of musculoskeletal conditions. No serious or catastrophic adverse events were reported in the clinical studies or systematic reviews. However for the adult population, it has been estimated that between 0.003% and 0.13% of manual therapy treatments may result in a serious adverse event. Although mild to moderate adverse events are common in adults, an accurate estimate from high quality pediatric studies is currently not available. One report of an catastrophic "outcome" with letal consequence in an osteopathic treatment of a newborn is discussed.
Conclusion There is currently insufficient research evidence related to adverse events and manual therapy. However, clinical studies and systematic reviews from adult patients undergoing manual therapy, particularly spinal manipulation report that mild to moderate adverse events are common and self limiting. However serious adverse events are rare and much less than for medication commonly prescribed for these problems. Basic research, specifically addressing adverse events in the pediatric population, is needed.

Beste Poster-3

Immobilisierungstechnik nach Hüftgelenksrekonstruktion bei Kindern – Bedarf neuer Techniken?

L. Pisecky, M. Klotz, T. Gotterbarm

Questions In children with spastic hip dislocation most surgeons prefer spica cast immobilization following hip reconstruction. Nevertheless, this challenging treatment may be associated with complications such as skin problems, fragility fractures, joint stiffness, neurovascular damage, unplanned outpatient returns for cast-related issues and compartment syndrome. Because studies investigating the complications caused by spica cast are few, the purpose of this study was to identify such complications after hip reconstruction.
Methods In a retrospective study the data of a consecutive series of 72 patients, who were treated with spica cast immobilization after hip reconstruction during 2010 and 2018, was analyzed. The complications were rated according to the Clavien-Dindo system. From 2010 to 2018, 46 female and 26 male patients were treated with spica cast immobilization. Surgery was performed on the right side in 25, on the left in 27 and on both sides in 20 cases. The mean age at sugery was 7,97 years.
Results Spica cast immobilization was applied for 6,22 weeks (SD 1,23). We found complications in 20 cases. According to the classification system of Clavien-Dindo, we had 5 type I, 10 type II and 5 type III complications. No type IV and V occurred. Complications were superficial and deep woud infections, compliance problems, non-fitting casts, reluxation, broken plate and prolonged healing of the bone.
Conclusion Some surgeons seek for alternative devices enabling early mobilization to avoid cast associated complications. The results of this study underline the concerns of these surgeons, because complications were present in 28 percent of the patients. According to Clavien-Dindo, type II complications or higher need intervention by the physician and change of postoperative care. Fifteen of our 20 cases with complications were type II and III, which leads us to our conclusion, that we expect the use of a foam splint in postoperative lower extremity immobilisation is an effective intervention to reduce the incidence of skin complications in patients after surgical hip reconstruction. Furthermore it is thought to be cost-effective compared to our casting algorithm.
We started to develop a regime of immobilisation with a foam splint system, developed by a local orthopaedic technician using a 3D printing technique.
To evaluate our new system we started a prospective randomized controlled clinical trial to prove effectiveness and safety. We want to present the system and our first results.

Wirbelsäule

V1-1

Elterliche Internetrecherche auf kinderorthopädischem Gebiet – Ergebnisse einer kontrollierten, prospektiven Studie

C.-D. Peterlein, M. Bosch, S. Fuchs-Winkelmann

Questions The internet has become one of the most important sources to obtain medical and health information. Parents, whose children are affected by systemic diseases, anomalies, deformities or further orthopaedic defective positions, use the internet to increase their knowledge. There is a lack of studies with focus of parental enquiries in the internet before contacting the pediatric orthopaedic surgeon. This study shows current trends and also allows a follow up.

Methods Parental internet search was evaluated using a standardized questionnaire. General habits of internet use, local hardware equipment, age and educational background of the parents were analyzed. In particular, parental use of general medical websites, use of search machines like Google or Yahoo or the use of homepages from support groups was asked.
Results A total of 521 questionnaires were completed, this corresponds to a response rate of 96%. One quarter of parents (n=127) attended the consultation because of a gait anomaly or foot deformity, followed by children with DDH (20%, n=99), club foot (9%, n =47) and scoliosis (6%, n=29). 87% (n=450) of parents use a Smartphone to get internet access, 68% (n=354) a Laptop, 55% (n=288) a Tablet and 45% (n=232) a Computer. Especially parents with children with clubfoot looked for health information online (84%, n=38), followed by scoliosis 69% (n=20), DDH 67% (n=66), foot deformity / gait anomaly 49% (n= 62). 97% (n=295) of those using the internet for health medical purpose made use of a search engine, 99% (n=291) of internet users searched through Google, with 44% (n=129) of them describing their research helpful. Concerning use of social media responders of clubfoot children were again the most numerous in number (38%, n=18). 10 of them stated to have exchanged with other social media users and 60% of them evaluated social media as helpful. There were 35 parents who intended to discuss the results with their pediatric orthopedic surgeon. 84% (n=254) of the responders who used the internet for health research would return to the internet.
Conclusion This study documents that the internet is an important source of information for parents or caregivers in the field of pediatric orthopaedics and that the meaning goes even further. Treating physicians will increasingly be confronted with the results of internet research. In particular, parents whose children suffer from club feet frequently research the Internet.

V1-2

Seriengipsredression für Early Onset Skoliose – Ergebnisse

K. Mladenov, T. Ballhause, P. Kunkel, C. Hagemann, R. Stücker

Questions Background data: Serial casting is currently used for the treatment of early onset scoliosis in children before age 5 in order to achieve curve correction before bracing or to postpone initial surgical treatment until the patient is older. Good results have been reported for patients with idiopathic curves. However there are no reports about the results in non-idiopathic cases and the true benefits of nonsurgical methods in this subgroup are poorly defined.
Purpose: To describe our treatment protocol and to evaluate the results after serial casting for patients with early onset scoliosis.
Methods Retrospective single institution study of patient charts and X-rays of all cases sustained serial casting for EOS.
Description of treatment protocol: Casts were apllied on a Risser table with the patient in general anesthesia. Correction manouever consisted of longitudinal traction, derotation and leteral pressure. Staged correction was obtained by means of a total of three casts changed at 4 weeks intervals, followed by the implementation of a custom made full-time “Soft-Boston” type brace.
Results Nineteen consecutive patients comprised the study group (n=19), two patients were lost from follow up 8 and 10 Months after completion of casting.
There were 6 idiopathic, 11 syndromic and 2 neuromuscular curves.
Mean age at onset of treatment: 3,2 yrs (range 1,2 – 5 yrs)

Mean follow up: 2 yrs (range 6 mo – 4,5 yrs)
Mean Curve Cobb before treatment: 53,2° (range 35°-85°)
Mean Curve Cobb after application of the last cast: 26,6° (0°-48°)
Mean Curve Cobb at latest f/u: 27,7° (4°-48°)
Mean Correction at latest f/u: 24,7° (47,5%) (p< 0.001)
Loss of curve Correction between end of casting an latest f/u: 1,1° (p >0,05)
In only one case significant progression of the curve to 78° two years after completion of serial cating was noticed. The patient had surgical correction by means of growing rods.
Complications related to casting/bracing:
Severe Skin breakage: none
Abandon of treatment due to compliance issues: none
Relapse of Scoliosis: 1 (5,2%)
Conclusion Serial casting is a very good treatment option for the treatment of EOS and should be considered even in patients with non-idiopathic curves. Our results show that in 95% of the cases significant curve correction can be obtained and curve progression can be reversed or stopped. In all of the cases surgery can be delayed untill the child is older. Syndromic or neuromuscular etiology is not a negative predictive factor for poor responce to serial casting in EOS.

V1-3

Die Langzeit-Behandlung der kindlichen Skoliose bei spinaler Muskelatrophie mit extern zu kontrollierenden magnetischen Implantaten

H. M. Lorenz, M. M. Hecker, B. Badwan, L. Braunschweig, K. Tsaknakis, A. K. Hell

Questions Growth-friendly implants have been introduced in children with progressive spinal deformity. To avoid repetitive surgical interventions, externally controlled magnetic devices have been successfully established for children. In the past, the ‘law of diminishing returns’ described a decrease in the potential correction in spinal deformity children treated with growing rods over time. The aim of this long-term study is to assess the spinal deformity control in a homogeneous spinal muscular atrophy (SMA) patient group treated with the magnetically controlled growing rod (MCGR) system for a period of more than four years.
Methods This prospective study focuses on 18 children with SMA and progressive scoliosis, who were treated with bilateral MCGR system inserted parallel to the spine with a rib to pelvis fixation. Radiologic measurements of scoliotic curves, pelvic obliquity, spinal length, kyphosis and lordosis were performed before and after MCGR implantation and during magnetically controlled lengthenings. Minimum follow-up was four years and the mean follow-up was 4.95 years.
Results The average Cobb angle of the main curve was 69° prior to MCGR implantation and decreased to 29° after surgery. Correction was maintained during the period of follow-up (28° at longest follow-up after 18th lengthening). Pelvic obliquity could be surgically corrected from 17° to 4°, which implies a correction of 75% and could be kept stable during follow-up observation. MCGR implantation caused a sudden increase in spinal length of 50 mm. Long-term correction of kyphosis or lordosis could not be achieved using this two-point fixation method. The overall complication rate was 6.7% (20 complications within 298 interventions), affecting twelve of 18 patients.
Conclusion Bilateral implantation of the MCGR system with rib to pelvis fixation maintains sufficient and stable scoliotic curve correction and pelvic obliquity normalisation for SMA children with spinal deformity for an average of more than four years. Spinal length was continually increased and complication rates per intervention were low with 6.7%.

V1-4

Spondylodeseergebnisse für Patienten mit Spinaler Muskelatrophie (SMA) Patienten mit oder ohne chirurgischer Vorbehandlung

A. K. Hell, M. M. Hecker, L. Braunschweig, K. Tsaknakis, H. M. Lorenz

Questions Children with spinal muscle atrophy (SMA) nearly all develop a scoliosis during childhood and adolescence. Because of lung impairment, brace therapy is not feasible. In the past, several growth-friendly implant systems for spinal deformity control such as the vertical expandable prosthetic titanium ribs (VEPTR) or the magnetically controlled growing rods (MCGR) have been established. These systems serve as an interim until definite spinal fusion can be performed. The purpose of this study was to analyze the effect of prior growth-friendly spinal surgical treatment on the outcome of the definite spinal fusion in SMA children in comparison to a previously non-treated group.
Methods Twelve SMA patients with and 13 SMA patients without prior surgical treatment with a growth-friendly implant were included in this study. Average surgical treatment prior to definite spinal fusion was 4.8 years. Scoliotic curve angle, pelvic obliquity, spinal length, kyphosis and lordosis were evaluated during VEPTR/MAGEC treatment for the 12 children with prior treatment and before and after spondylodesis for all children. Results were compared and statistical analysis was performed.
Results Analysis of both patient groups revealed significant differences of the scoliotic curve and pelvic obliquity. The curve angle before definite spinal fusion was averaged at 99° for SMA patients without prior treatment and 71° for patients with prior treatment, who had received a removal of growth-friendly implants. Spondylodesis decreased the scoliotic curve to 49° and 33° respectively, which equals a correction of 51% versus 54%. Pelvic obliquity could not be improved by spinal fusion in children without prior treatment (13° before and 16° after surgery), whereas patients with prior treatment experienced a decreased pelvic obliquity from 15° to 5°. Spinal length, kyphosis and lordosis were similar in both groups.
Conclusion These data show the positive effect of prior growth-friendly surgical treatment on the results of spinal fusion in children with SMA. Both scoliotic curve angle and pelvic obliquity showed better values when patients had a VEPTR or MAGEC implant before.

V1-5

Vertebral Column Resection in der Behandlung schwerstgradiger kyphotischer Wirbelsäulendeformitäten

R. Stücker, K. Mladenov, C. Hagemann, P. Kunkel

Questions In most severe kyphotic deformities a VCR is almost always required, but there is little evidence in the literature on the outcome of such treatment in the pediatric population. We present a case series of 10 patients with most severe kyphotic or kyphoscoliotic deformities of more than 110 degrees, treated by VCR and report on technique, complications and outcome.
Methods Inclusion criteria were kyphotic or kyphoscoliotic deformities in children and adolescents of more than 110 degrees. Patients with gibbus associated with myelomeningocele were excluded. There were 10 patients, 6 male and 4 female, with an average age of 11+10 years (8–18 years). The kyphosis ranged from 110 to 136 degrees with various etiologies. 7 of the patients had previous unsuccessful surgery. 4 of the 10 patients already presented with neurological signs including weakness of lower extremities or incomplete paraparesis.

Follow-up was 40 months (12–108 months). 5 of the 10 patients had preliminary halo-traction for 3-6 weeks. In all cases a VCR was performed.
Results Surgery time was 5–8 hours. Blood loss was 700 cc (500 to 2000 cc). In addition to a VCR a posterior fusion of a medium of 10,6 segments (5–15 segments) was performed. Complications during surgery included temporary or complete loss of signals in 4 patients and 1 dural tear. 3 patients had paraparesis after surgery which improved completely after 4–12 weeks. 1 patient developed a permanent paresis of the quadriceps on one side. 4 patients with neurological signs before surgery all improved in function but not to normal levels.
Postoperatively, 8 of 10 patients developed pleural effusions and one patient had to be revised due to cage malposition.
Kyphosis significantly improved from a medium of 123 (110–136) to 54 (0–88) degrees, representing a correction of 54% (24–100%). The scoliotic deformity significantly improved from a medium of 72 (0–115) to 41 (0-76) degrees after surgery, representing a correction of 44% (0–76%).
No loss of correction occurred during the follow up period, but one patient developed PJK and had to be revised 12 months after the index procedure.
Conclusion Most severe kyphotic deformities with kyphosis > 110 degrees can be treated by VCR and spine fusion with acceptable complication rates.

Hüfte, Neuroorthopädie

V2-1

Epiphysiolisis capitis femoris: Eine Analyse der Literatur bezüglich Osteonekrose und Arthrose nach in situ Verschraubung, extrakapsulärer Osteotomie (Imhäuser/Southwick) und modifizierter subkapitaler Osteotomie nach Dunn.

N. Guindani, F. F. Fernandez, O. Eberhardt, T. Wirth, M. De Pellegrin

Questions The epiphysiolisis capitis femoris (ECF) defines different challenging pathologies, many treatment methods and surgical techniques have been proposed during years. Currently there is no agreement about the best treatment for each condition. The aim of this study is to compare the rate of failure of three different techniques: in situ pinning (ISP), extracapsular Imhäuser/Southwick osteotomy (ECO) and modified Dunn osteotomy (MDO).
Methods Medscape, Ovid, PubMed e GoogleScholar databases were searched for ISP, ECO and MDO for SCFE, SUFE or ECF. Only primary literature articles were selected; reviews, metanalysis and data supposed to be already used for other studies were excluded. To reduce the number of outcomes and variables, only the development of osteonecrosis (AVN) and osteoarthrosis (OA) were considered, compared to each technique and follow-up length.
Results Of the 39 studies (1637 hips) included were 11 for ISP (844 hips, 18 years follow up), 15 for ECO (409 hips, 13 years follow up) and 13 for MDO (384 hips, 4 years follow up). The rate of AVN was 4% for ISP, 3% for ECO and 9% for MDO. The rate of OA was 33% for ISP, 19% for ECO and 0% for MDO. Considering the progression over time of AVN and OA together there is a lower increase over time for MDO in comparison with ISP and ECO.
Conclusion The adoption of any surgical treatment must be based on improvements over the natural history of the untreated disease, the outcome of current techniques and complications related to the procedure itself. Although the outcome variables and definitions of ECF often have not been consistent during decades, AVN develops only within the first 2 years, the incidence is constant over years and is higher in MDO; the rate of AO progress

over years and has a lower incidence in MDO. However, due to the different follow up lengths, the real progression rate still must be measured. It was not possible to find differences between ISP and ECO (with p<0,05) but there is a tendency to lower incidence of AO for ECO. The choice of the most appropriate treatment for ECF remains an arduous task. In our opinion ISP should not be considered for severe ECF due to the poor natural progression of the disease and OA. On the contrary, the higher rate of AVN after MDO, potentially worse than ECF itself, contraindicate this procedure for mild cases and is justified only when facing severe ECF and conceivably otherwise lost hips.

V2-2

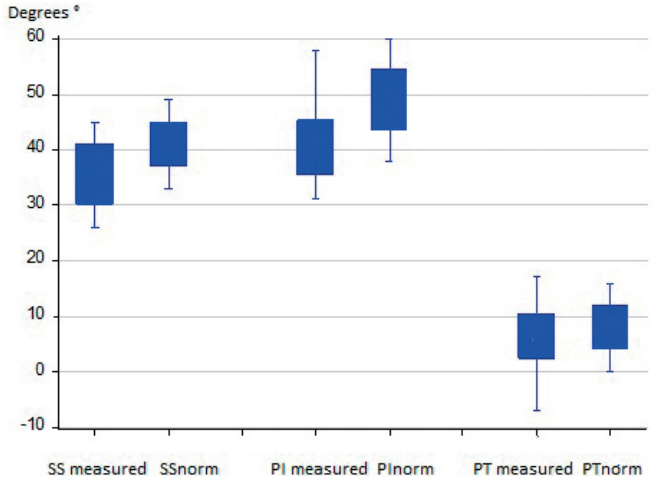
Pincer-Impingement: Pfannen- oder Beckendeformität?

V. Frimberger, B. Heimkes

Questions Pincer impingement is characterized by a mechanical conflict between the femoral neck and the rim of the socket. It raises the question of the causality of this entity. Is it retroversion of the acetabulum (acetabular), the pelvis (pelvic) or a mixed type (intermediate)?

Methods We present 11 patients (7 f, 3 m) who presented themselves with unclear groin pain during our consultation in the period from 2016 to 2018. The patients were diagnosed using the following X-ray images: pelvic x-ray (PX), false profile, spinopelvic balance (lumbar region including pelvis sideways). We measured: crossover Sign, ischial spine sign, posterior wall sign, Sharp-Angle (SA), lateral center edge angle (LCEA), anterior center edge angle (ACEA), sacral slope (SS), pelvic incidence (PI), pelvic tilt (PT). The study focuses on the differentiation between acetabular and pelvic retroversion based on the available radiographs.

Results The youngest patient was 10, the oldest 34 years old. Median age was 14 years. 3 Patients complained of right-sided, one of left-sided and 6 patients of bilateral hip pain. SS showed a median of 32.4 ° The PI fell with a median of 38 ° well 10 ° below the norm. The PT remained at a median of 5.9 ° well 2 ° below the norm. All but one patient showed signs of acetabular retroversion. The SA was 89% on the right and 75% on the left. The ACEA on the right was 57%, the left ACE 83% above the age standard. The LCEA was 80% on the right and 66,6% on the left within the age standard.



spinopelvic balance

Conclusion In the case of pure acetabular retroversion (type A) SS, PI and PT are normal, but ACEA is elevated. The intermediate type (type I) is characterized by an increased SS and a decreased PT, the PI is normal, ACEA can be elevated, decreased or normal. The pure pelvic retroversion (type P) results in a secondary retroversion of the acetabulum and exhibits normal SS, decreased PI and PT and increased ACEA. In our study, we count 2 patients with type A, 2 patients with type I and 6 patients with type P. Therapeutic consultation, physiotherapy and, finally, surgery are available.

V2-3

PFFD – Ergebnisse und Komplikationen der LCP bei Valgisierung

S. Brosseder, M. Kröner, S. Nader

Questions PFFD is a rare malformation of the femur. The main aspect is the partially or completely missing femoral head and neck. In mild cases, often Coxa vara is observed – Aitken Type A. To improve function of the hip joint, or healing of the kongenital pseudarthrosis of the neck we performed subtrochanteric valgisation and ostesynthesis with LCP plate.

Methods From 2008 to 2018, all cases of PFFD and surgery of the proximal femur with LCP plate were included in the study. 46 cases were identified. Aim of the retrospective protocol was to figure out what happens after plate removal and if there is any evidence of a preferable angle of the plate that should be used when doing the valgisation osteotomy using LCP plate.

Related to age and weight, either a 2,7mm, 3,5 or 5mm LCP was used. The angle of the plate varied from 90° to 150°. The screws used to fixate the proximal fragment were placed inside the femoral neck and head using intraoperative imaging with contrast. The distal screws were placed bicortically in the femoral shaft.

Plates used: 90° - 1 case, 110° - 2 cases, 120° - 6 cases, 130° - 20 cases, 150° - 17 cases.

Results Average CCD before surgery: 92°

Average CCD after surgery: 120°

Average CCD one year after plate removal: 112°

Average CCD up to five years follow-up: 108°

In total, there were 14 cases with complications. pseudarthrosis (5), loss of correction (3), screw breakage(8), infection (1).

Of all complications reported we did not experience any problem regarding the screws within the group of the 150° LCP plate. 2 cases presented with a loss of correction and one pseudarthrosis (already a revision/revision case due to infect and pseudarthrosis) – complication rate: 20%

The group using the plate with a lesser angle, all complications regarding the stability of the screws and primary pseudarthrosis occured. The 110° plate with one complication (50% rate), the 120° plate with 3 complications (50% rate), and the 130° plate with 7 complications (33% rate).

Conclusion After removal of the plate, revarisation is common. Furthermore, considering biomechanical aspects, it is probably a good idea when using a LCP plate to choose the most valgic angle of the plate possible. The data of our study supports this theory.

V2-4

Modellierung von EMG Signalen zur Entwicklung eines Ergometer-Trainings für Patienten mit Zerebralparese

S. Roy, A. Alves-Pinto, F. Mayerle, R. Lampe

Questions Cerebral palsy (CP) encompasses a group of disorders of movement caused by damage to the developing brain occurring before, during, or immediately after birth. Although brain injuries are irreversible, therapy is important to keep overall health, to improve muscle coordination, balance, strength and therefore smoothness of movements. Cycling on the ergometer can be a part of rehabilitation programs to improve their movement ability.
Methods Electromyographic (EMG) signals of leg muscle activity during cycling were recorded from 14 patients with CP and 10 healthy participants with a self-developed EMG system. Activities of the following muscles were recorded:
M. biceps femoris, M. rectus femoris, M. tibialis anterior and M. gastrocnemius. Qualitative and quantitative analysis of individual muscle activity results more irregular EMG patterns in patients than the healthy controls. Collected EMG signals were also mathematically processed to model muscle force taking into account the filtering effects, electromechanical delay and nonlinear effects between the neuronal signal and the effective activation of muscle fibers.
Results Qualitative and quantitative analysis of individual muscle activity results more irregular EMG patterns in patients
than the healthy controls. In particular, occurrence of co-contractions, simultaneous activation of agonist and antagonist muscles were observed which can hinder the ability to perform a regular movement.
Conclusion Understanding of muscle force employed by patients with CP and by healthy controls may give an indication on how cycling training can be used for rehabilitation. Furthermore, individual cycling training can be planned by changing the dynamical resistance of the ergometer using real time EMG signal as a feedback system.

V2-5

Effekt der Elektrostimulationsorthese auf die dreidimensionale Fußbewegung während des Gehens bei Kindern mit Zerebralparese

H. Böhm, C. Dussa

Questions Common impairments in children with cerebral palsy (CP) are excessive plantarflexion during stance and insufficient ankle dorsiflexion during swing, or foot drop. These abnormalities may cause standing and walking instability, and greater risk of tripping and falling. Ankle–foot orthoses are the standard of care for foot drop in CP, but may constrain ankle movement and limit function. By restricting ankle movement, orthoses may further exacerbate muscle weakness and atrophy. Functional electrical stimulation (FES) was shown to be a less restrictive and a more effective alternative [1]. Previous studies have addressed the improvement of ankle dorsiflexion during swing and initial contact. However, the foot motion is 3-dimensional and if the stimulation of m. peroneus longus and m. tibialis anterior is not well balanced, excessive eversion or inversion of the foot can occur respectively. Therefore, the objective is to show the effect of FES on foot motion during walking.
Methods Sixteen patients with uni- and bilateral CP between 9 and 17 years GMFCS I and II and foot drop were included. Gait analyses in FES and non-FES conditions were performed at preferred walking speed using the Oxford Foot Model. Differences between conditions were revealed using a t-test on a significance level of 5%.

Results The passive dorsiflexion of the patients was between -5 and 5°. Use of FES increased peak dorsiflexion in swing phase during walking between 3° and 15°. The amount of increase was related to the amount of foot drop in the non-FES condition. Eversion of the rearfoot and abduction of the forefoot increased during initial ground contact on average 6.1° (SD=2°) and 4.0° (SD=3°) respectively. Although 6 patients showed excessive rearfoot eversion at initial contact in the non-FES condition, FES produced no movement towards inversion in any of the patients.
Conclusion As intended, FES increased dorsiflexion in swing phase during walking. The consistent increase in rearfoot eversion in all patients improved foot deformity in 8 patients with clubfeet but deteriorates flatfoot deformity in 6 cases. This consistent increase in rearfoot eversion may be due to the strategy of choosing large stimulation intensity and accept exaggerated eversion. While this strategy provides a certain amount of safety and functionality, it deteriorated flatfoot deformity. In conclusion FES improved dorsiflexion and had a great potential for clubfoot correction.

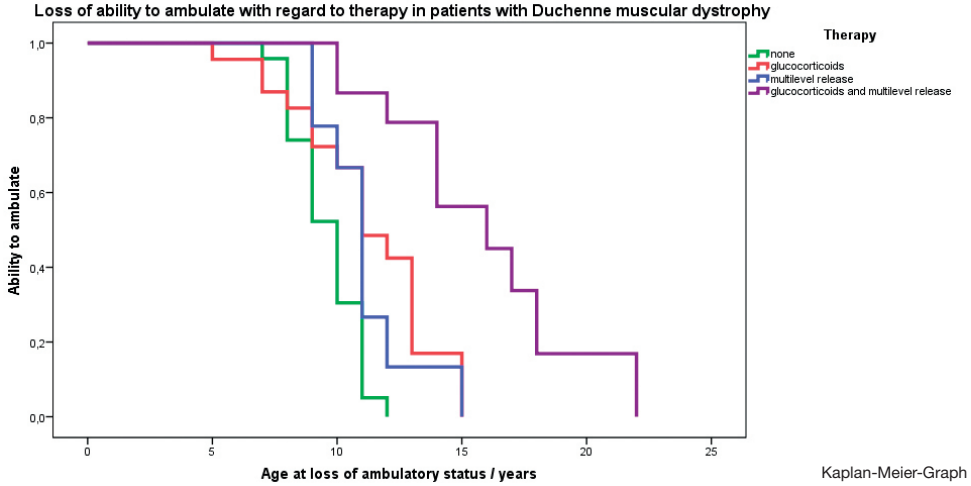
[1] Prosser et al. Dev Med Child Neurol. 2012 54(11):1044-9.

V2-6

Additive Effekte von Mehretagenreleases und Glukokortikoiden in der Behandlung von Duchenne-Patienten

A. Rakow, C. Weiß, C. Stoltenburg, S. Lebek, J. Funk

Questions Different regimens of steroids are currently the main component of drug therapy for Duchenne muscular dystrophy(DMD), prolonging ambulation, preserving upper limb and respiratory function and avoiding scoliosis. A multilevel contracture release has been shown to effect ambulation positively in DMD, with patients operated on early in the course of the disease benefiting most. However, an independent effect of steroid treatment has not been evaluated and, to date, international guidelines do not include multilevel surgery.



Kaplan-Meier-Graph

Methods We analysed all DMD patients who consulted our outpatient clinic between 2013 & 2017.Ambulatory patients had been offered steroid treatment.Patients with initial contractures of the hip, knee and ankle joints and shortening of the iliotibial band were offered

bilateral hip and knee releases,aponeurectomy of the IT band and Achilles tendon lengthening.If they had sufficient quadriceps strength,i.e. total muscle force of >/=3/5 MRC, and were able to rise from a supine position to standing in <5s. Patients received soft casts for one week and were mobilised out of bed on postoperative day one. They underwent inpatient physical therapy (PT) for 4-6 weeks. None of them was splinted after surgery.

Results 86 patients were included.Mean age was 16.3yrs (1.9-42).All patients received non-standardised PT. 44 had been treated with glucocorticoids (GC) for a mean of 5.6 yrs (0–18).Median age at loss of ambulation was 12yrs in patients treated with GC as opposed to 9 yrs in those without GC. 27 patients underwent Rideau's multilevel contracture release at a median age of 7.1 yrs (4–10).These patients lost ambulation at a median age of 12 yrs. We found a significant additive effect of both therapies: while patients having received neither GC nor surgery lost ambulation at a median age of 9 yrs, those with GC and surgery were able to walk independently until a median age of 14 yrs, hence 2 yrs longer than with only one of the two treatment options.

Conclusion Standard GC treatment and early multilevel contracture release in lower limbs have a positive effect on prolongation of ambulation in DMD. Combination of both therapies is significantly more effective than each single therapy.

Wuchslenkung, Varia

V4-1

Hemiepiphysiodese an der distalen medialen Tibia bei Valgusfehlstellung des Sprunggelenks

A. Herzog, F. F. Fernandez, T. Wirth

Questions Guided growth through hemiepiphysiodesis of the distal medial femur has been established to be the optimal surgical correction method of valgus malalignment of the knee during growth period.

However, the supramalleolar osteotomy has remained to be the most commonly considered treatment option for ankle valgus.

While previous publications have mostly been focusing on the validity of the guided growth as treatment option for ankle valgus resulted from a specific pathoetiology, e.g. hereditary multiple osteochondromas; the purpose of this retrospective review is to evaluate the correction results of post-traumatic and idiopathic ankle valgus that were primarily treated by guided growth through hemiepiphysiodesis of the distal medial tibia.

Methods We have reviewed 15 cases involving a total of 24 ankles with either post-traumatic or idiopathic valgus malalignment that were treated in our department in a period of 10 years between 2008 and 2017.

An ankle valgus was defined with a lateral distal tibial angle less than 86 degrees that was measured in a weightbearing anteroposterior radiograph of the ankle, which was performed pre-treatment, upon implant removal and every 3 months in between in all cases.

All cases were concluded at the time this study was conducted.

Results The demographics of the study cohort spread between 9.3 and 15.1 years of age (13.2 ± 1.6) at the time of the initiation of the guided growth. The initial lateral distal tibial angle ranged between 74 and 83 degrees (78.9 ± 2.9).

In 4 cases, the ankle valgus manifested post-traumatically while the malalignment of the ankle in the other 11 cases was idiopathic.

The total duration of the guided growth treatment lasted between 22.1 and 137.6 weeks (63.4 ± 36.3). The patient age at the time of the implant removal spread between 11.9 and 16.9 years of age (14.4 ± 1.4). The implant removal was indicated either after sufficient correction or due to distal tibial physeal closure. The lateral distal tibial angle upon implant removal ranged between 81 and 90 degrees (87 ± 2.4).

Conclusion In conclusion, the guided growth through hemiepiphysiodesis of the distal medial tibia has been observed to be a valid treatment option for post-traumatic and idiopathic ankle valgus during growth period.

Shorter hospitalization, much shorter postoperative non-weightbearing period, and fewer surgical procedures and general anesthesia required due to simultaneous bilateral intervention, are advantages of guided growth compare to supramalleolar osteotomy.

V4-2

Permanente Epiphyseodese mit einer kanülierten Knochenstanze – erste Ergebnisse

J. N. Bröking, R. Rödl, G. Gosheger, B. Bröking, A. Frommer, G. Toporowski, A. Rachbauer, A. Laufer, B. Vogt

Questions A variety of techniques of permanent epiphyseodesis (PED) for the correction of leg length discrepancy (LLD) or tall stature (TS) were described, especially those by Phemister and Canale. Both techniques are associated with some difficulties like soft tissue problems (Phemister) or insufficient targeting of the physis (Canale). Therefore we invented a technique of PED using a new designed cannulated bone trephine (CBT). The technical challenge to ensure that the physis is completely resected becomes easier to control and the technique is less invasive.

The preliminary reports are demonstrated in this study.

Methods The technique of PED begins with the fluoroscopy-assisted insertion of a drill guide into the physis. An epimetaphyseal bone cylinder containing the growth plate is removed with a CBT. The physis is macroscopically identified over the whole length. The cylinder is reinserted in 90° rotated position building a bone bridge over the physis. The results are documented by fluoroscopy.

Since 2016 16 patients are treated with PED using the CBT because of LLD (group A, n=6) or TS (group B, n=10). The median age was 13.1 years and median follow up 8.7 month. Before and after the operation a.p. long standing radiographs were analysed measuring the length of femur, tibia and whole leg, mLDTA, MPTA and MAD. The operation data (cut-suture-time (CST), fluoroscopy-time (FT)) and complications were recorded.

Results Patient's stay in hospital was 2-3 days postoperative in both groups. All patients were able to full weightbear before leaving hospital. Median CST was 29.0 min/physis and FT was 0.38 min/physis without differences between the groups.

In group A, median reduction of LLD was 7.5 mm (0.9 mm/month). Segmental correction of length discrepancy was 6.0 mm (0.98mm/month) for the femur and 5.5 mm (0.60 mm/month) for the tibia. Change of MAD was only 3.0 mm (0.42mm/month). Median changes of mLDTA was 1.0° (0.11°/month) and MPTA 1.0° (0.11°/month).

In group B, change of LLD was 1.0mm (0.16mm/month). Change of MAD was 3.0 mm (0.45mm/month). Median changes of mLDTA was 1.0° (0.10°/month) and MPTA 0.5° (0.03°/month).

There were no major complications in both groups.

Conclusion The described technique of PED using a CBT showed promising results. The ability to macroscopically identify the resected physis grants a more secure effectivity of the PED in combination with less invasive surgery and few complications. Further studies are needed to verify these preliminary reports.

V4-3

Automatisierte gegen Manuelle Knochenalter Bestimmung nach Greulich-Pyle bei Patienten mit Reduktionsdefekten der Unteren Extremität – Gibt es einen Unterschied? – Eine Retrospektive Studie

H. Forkl, F. K. Afifi, S. Marx, S. Nader

Questions Bone age (BA) plays a crucial role in setting a treatment plan in patients with lower limb reduction defects. However, the prediction using the manual Greulich-Pyle (GP) is considered of a great challenge specifically in this group of patients. Through this retrospective study we aim to show if the results of the automated method (BoneXpert®) and the manual GP method vary in terms of BA prediction in patients with lower limb reduction defects.

Methods Between September 2011 and November 2015 seventy three (73) patients were recruited. All patients were diagnosed with mono- or bilateral fibular hemimelia. A total of one hundred and twenty eight (128) hand X-rays were evaluated by three pediatric orthopedic surgeons to predict the BA manually. The automated method was likewise used to predict the BA. The results were compared with the chronological age (CA) of the patients. Paley's multiplier was used to predict the height and length difference by the end of maturity. These results were compared as well.

Results There was no significant difference in BA prediction between the observers using the manual method (r=0,996). A significant difference (p<0,05) was seen between the manual BA prediction (mean 6,5 +/-3,3 years) and BoneXpert® (6,8 +/-3,3 years). The manual GP method predicted significantly lower mean BA (6,5 years) than the mean CA (6.9 years). The automated method showed no significant difference with the mean CA. All observers showed no significant correlation in predicting both height and length difference (femur and tibia) by the end of maturity (r=0,96). However, these results differed significantly with the results using the automated method.

Conclusion Regardless the statistically proven difference between the two methods in predicting BA, we believe that the automated method is of beneficence in planning the treatment in patients with lower limb reduction defects. However, the clinical relevance of this statistical difference is also to be debated. Moreover, the time efficiency which is provided by the automated method is another important aspect which should be taken into consideration.

V4-4

Neue projektionsradiographische Referenzwerte der proximalen Fibula bei Kindern und Jugendlichen und eine kritische Analyse der Notwendigkeit einer proximalen fibularen Epiphyseodese bei proximal tibialer Epiphyseodese

A. Frommer, M. Niemann, G. Gosheger, J. N. Bröking, A. Laufer, A. Rachbauer, G. Toporowski, R. Rödl, B. Vogt

Questions Proximal tibial epiphysiodesis (PTE) is a common procedure for leg length discrepancy (LLD) and tall stature (TS). To prevent possible fibular overgrowth, proximal fibular epiphysiodesis (PFE) is frequently performed concomitantly to PTE.

Our study critically evaluates the relevance of PFE in tibial growth arrest and provides new standard radiographic reference values for proximal fibula height.

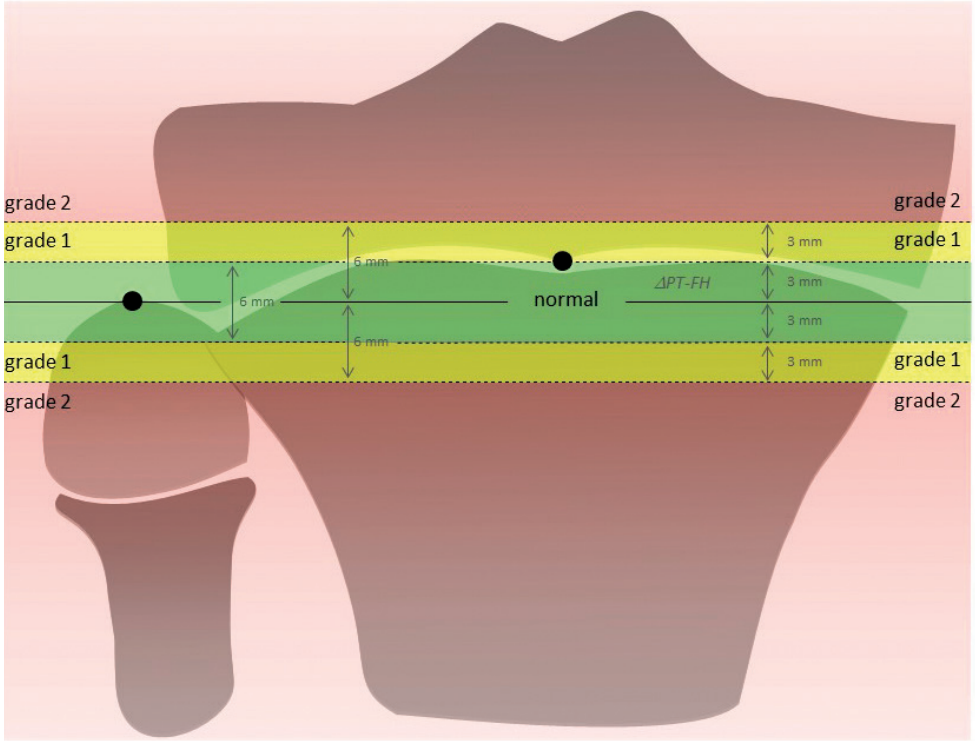
Methods The distance of the center of the proximal tibial growth plate to the tip of the fibular head (ΔPT-FH) was measured on healthy legs in 428 calibrated long standing radiographs (8–16 years(y), female(f) n=175, male (m) n=253) to obtain reference values. Additionally, calibrated long standing radiographs of patients who underwent temporary PTE with or without PFE for LLD or TS treatment (2009-2018) were analysed. PTE was performed either with tension band plates or rigid staples. Cannulated screws (Ø4.0 or 4.5mm) were used for PFE. Measurements were performed right before implantation (BI) and before hardware removal (BR).

Results Ø ΔPT-FH in healthy lower limbs: -2.55mm (f = -2.2 mm, m= -2.9 mm). First standard deviation (1SD) ΔPT-FH: 3.28 mm (f); 3.05 mm (m); 3.16mm (f, m).

For clinical practicability and considering measuring inaccuracy ΔPT-FH and the 1SD were rounded to -3mm and 3mm, respectively.

Temporary PTE was performed on 68 legs on 58 patients, Ø age: 11.96 y (f: n=20, 11.15y; m: n= 38, 12.42y). 37/68 patients (group1) recieved additional PFE, while in 21/68 cases (group 2) no PFE was performed. Ø follow up: 23.6 months. Ø ΔPT-FH BI: –5.14 mm (group 1), –3.45 mm (group2). Ø ΔPT-FH BR: -6.43 mm (group1), +0,01 mm (group 2).

Conclusion We suggest ΔPT-FH = -3 mm as a standard reference for the proximal fibula. Measurements within the 1SD of +/- 3 mm (ΔPT-FH ≤ 0mm to -6mm) should be considered as "normal". ΔPT-FH of ≤ -6 mm to -9 mm, or ≥ 0 mm to +3 mm should be regarded as a mild (grade 1) deviation. We propose to consider differences greater than the 2 SD as relevant (grade 2) overgrowth or shortening (ΔPT-FH > +6 mm or ΔPT-FH < -9 mm).



On average, no relevant proximal fibular overgrowth was observed in patients treated without PFE and therefore we believe that PFE is not necessary when treating LLD or TS with PTE in children and adolescents from 10-16y.

V4-5

3-dimensionale Deformitätenrekonstruktion der Beine durch Mehretagen-Osteotomien und Marknagel-Osteosynthese bei Jugendlichen mit heriditärer hypophospahtämischer Rachitis

G. Toporowski, R. Rödl, G. Gosheger, J. N. Bröking, A. Frommer, A. M. Laufer, A. M. Rachbauer, B. Vogt

Questions Vitamin D-resistant hypophosphatemia (VDRH) is a rare disease characterized by deficient renal tubular reabsorption of phosphate, leading to impaired bone mineralization and rickets. When supplementation therapy fails, patients frequently develop progressive 3-dimensional deformities of the lower extremities (mostly varus, antecurvation and antetorsion). Guided growth can only affect the coronal plane and often results in residual or even secondary deformities. Multilevel correction osteotomies and intramedullary nailing (IN) are an established method for sustainable 3-dimensional reconstruction of the deformities in adolescent patients.

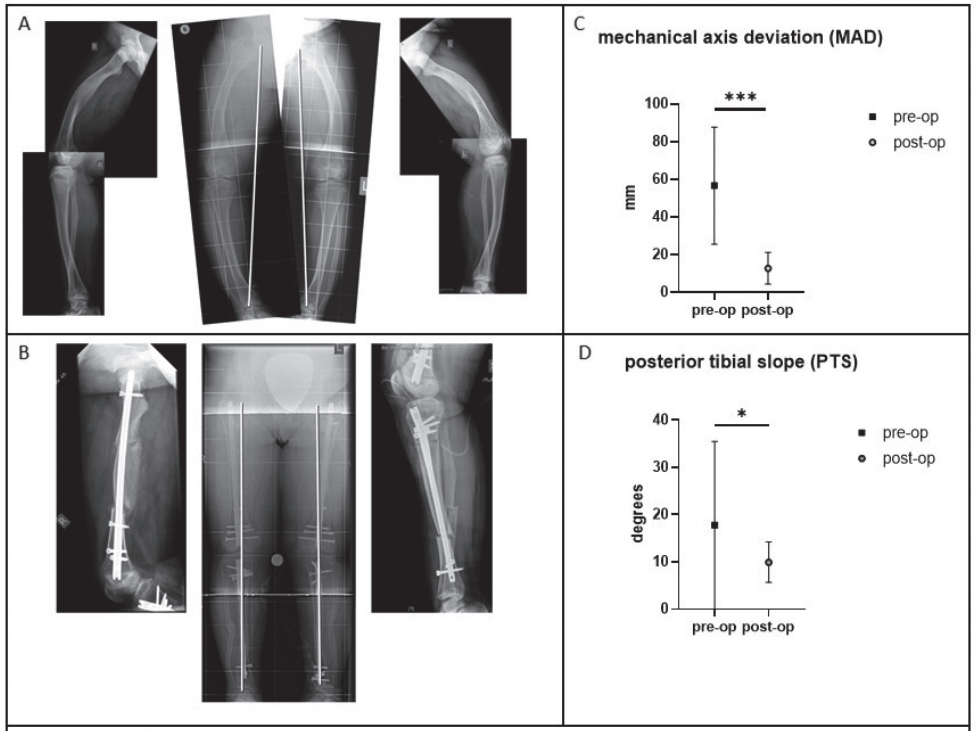
Methods 33 lower limb reconstructions with a total of 123 osteotomies in 20 patients with VDRH using IN (Trigen, Smith & Nephew) were performed. Femoral nails were introduced in retrograde, tibial nails in antegrade technique. An average of 3.7±0.4 (2-5) osteotomies per leg were necessary to achieve a correct 3-dimensional alignment.

Median age at operation was 17.5 years (14-49). Pre- and postoperative deformity analysis was done on calibrated long standing a.p. radiographs and lateral radiographs of the thigh and lower leg. Femoral and tibial torsion was assessed clinically or by CT-/MRI-scan. Statistical analysis was done using MS Excel 2010 and GraphPad Prism 8.0.

Results Mean follow-up was 16.7±9.3 months. All osteotomies healed. In total, the correction extent in coronal plane measured femoral 30.5±14.4°, tibial 18.4±7.4°, in sagittal plane femoral 28.4±12.7° and tibial 16.1±9.1°.

Mean mechanical axis deviation (MAD) was significantly corrected from 56.7±33.1 mm before surgery to 12.8±8.2 mm at follow up ($p < 0.0001$, MAD improvement of 77.4%). Postoperative posterior tibial slope (PTS) was significantly improved from 17.7±17.3° to 9.9±3.6° ($p < 0.05$). Torsion was sufficiently corrected in all cases. In 1/66 (1,5%) the IN had to be removed due to infection. As IN were kept in situ as permanent implants, no recurrence of deformity has been observed at follow-up examination.

Conclusion There are many treatment modalities for complex deformities in VDRH. We observed a stable correction without recurrence using IN. Although this operative technique might be more challenging, the advantages – the low rate of complications as well as the exact and significant correction after preoperative planning – are obvious. IN should be kept in situ to prevent fractures in the future.



A: Radiography of a VDRH patient with severe form of genua vara and antecurvation in tibia and femur.
B: Radiography after operative correction by introduction of IN: marked improvement of deformities in sagittal and coronar plane
C: A significant reduction of the mechanical axis deviation can be measured after operative correction
D: The posterior tibial slope is significantly improved after operative correction

Pre- and post-operative radiography of a VDRH patient with severe genua vara and antecurvation of femur and tibia

V4-6

Osteochondritis dissecans zeigt bei Patienten mit juveniler idiopathischer Arthritis einen schwerwiegenden Verlauf und ein schlechteres Outcome – eine Matched-Pair-Studie mit 22 Fällen

H. Kubo, H. Pilge, T. Oommen, M. Hufeland, P. Heusch, B. Westhoff, R. Krauspe

Questions Juvenile Osteochondritis dissecans (JOCD) and juvenile idiopathic arthritis (JIA) are both common diseases which may affect joints and bony structures in pediatric patients. In some cases, JOCD occurs in JIA patients. In this study the course of JOCD in patients with JIA was evaluated work out recommendations for treatment options and examination modalities during active JOCD disease.

Methods From 06/2012 to 03/2018 55 children with JOCD with or without JIA were examined. Inclusion criteria were: 1) age ≤ 16 years 2) diagnosis of a JOCD with or without JIA and 3) one initial MRI and two routine MRI controls. The JOCD evaluation based on the classification according to Bruns and the measurement of the largest extent via MRI. Eighteen of the cohort of 55 children met our critera: eleven JOCD findings of 7 patients with JIA (group A) were matched according to age and localization of JOCD to 11 patients without JIA (group B).

Results Mean age of disease onset of JIA was 8.2 years (oligo JIA) and of JOCD 11.6 years. The mean time follow-up was 17.7 months.
At all observation time points more severe JOCD findings (with stage III° and IV° respectively) along with a significant deterioration were seen in group A compared to group B. The comparison of the last MRI control between group A and group B showed a significant smaller defect size (decrease of 54.5%, p=0.028) in group B (97.9±48.9 mm2) as in group A (185.1±102.9 mm2). In comparison of first (169.7±84.2 mm2) and last MRI (97.9±48.9 mm2) a significant decrease in lesion size of JOCD in group B was seen (decrease of 58.4%, p=0.048).
Conclusion Patients with JIA show a more progressive and severe course of JOCD. Therefore, we recommend 1) the early use of MRI in patients with JIA and persistent joint pain to detect potential JOCD and 2) in presence of JIA and JOCD regular MRI follow up controls in closed intervals to identify deteriorating JOCD findings which may indicate surgical intervention to prevent early joint destruction in pediatric patients.

Unterschenkel, Fuß

V6-1

Effekt der distalen Tibia-Derotationsosteotomie auf Gangabweichungen bei Patienten mit isolierter vermehrter Tibia-Aussentorsion

N. Alexander, K. Studer, H. Lengnick, E. Payne, H. Klima, R. Wegener

Questions Tibial torsion is a rotational deformity between the proximal and distal joint axis along the shaft, which can be pathologically increased or decreased [1]. Patients might increase hip internal rotation during walking to compensate for increased tibial Torsion [2]. The aim of this study was to assess the effect of tibial derotation osteotomy on gait deviations in patients with increased tibial torsion.
Methods Thirteen patients (13.6±1.3yrs, BMI 19.1±1.8, 20 limbs) with increased tibial torsion (CT confirmed 49.2±4.8°) were analysed pre and post tibial derotation osteotomy and compared with 17 healthy controls (13.6±2.3yrs, BMI 18.2±2.5, 32 limbs). Kinematic (Vicon, 200 Hz) and kinetic data (AMTI, 1000 Hz) were recorded and three valid gait cycles were analyzed. Principal component (PC) analysis was used to achieve data transformation. A linear mixed model was used to estimate the main effect of PC-scores of retained PCs explaining 90% of the cumulative variance.
Results Pre-op patients walked with increased external foot progression angle (Figure 1, PC1 83.0%, p=0.000) and increased internal hip rotation (Figure 1, PC1 62.3%, p=0.000).

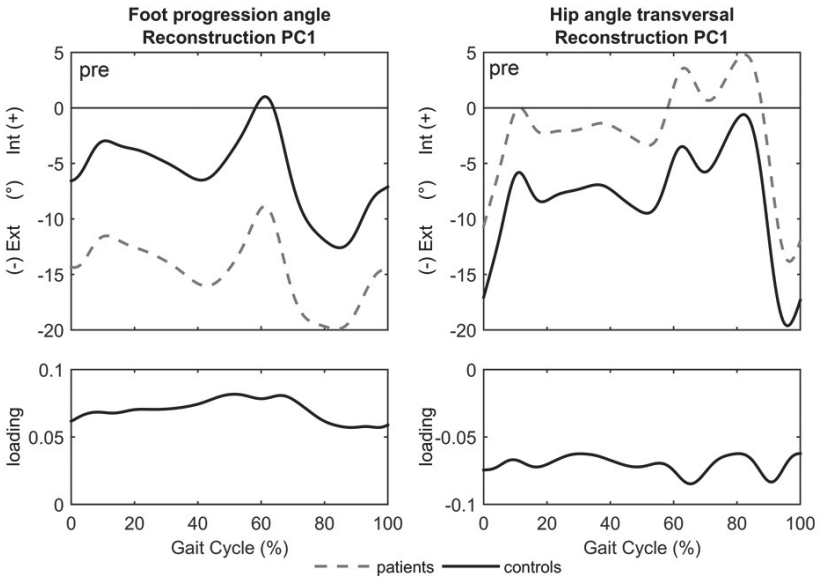


Figure 1: Pre-operative foot progression angle and hip rotation reconstructions and PC loadings.

Post-op the foot progression angle did not differ between patients and controls (Figure 2, PC1 69.2%, p=0.526). Patients still showed an increased internal hip rotation (Figure 2, PC1 62.8%, p=0.000), even though hip internal rotation improved post-op compared to pre-op (PC1 51.6%, p=0.008).

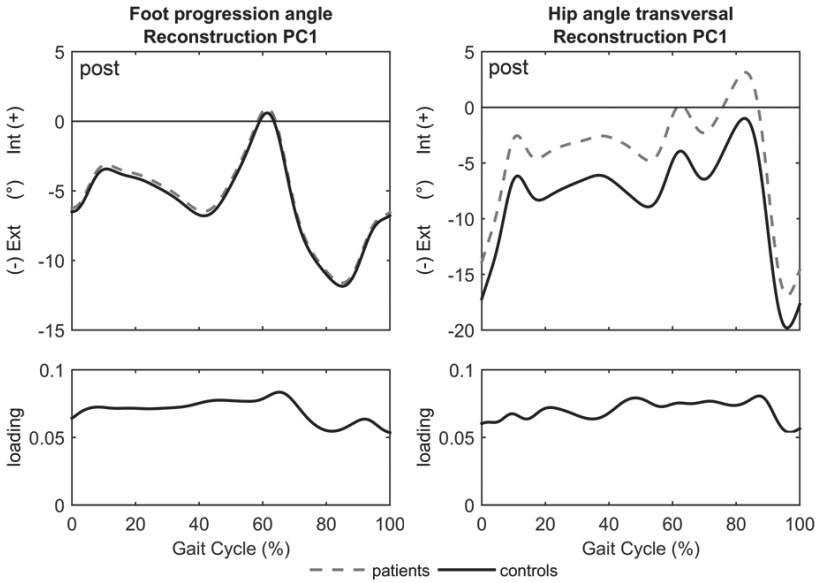


Figure 2: Post-operative foot progression angle and hip rotation reconstructions and PC loadings.

Conclusion Concluding, 1.2 ± 0.2 years after tibial derotation osteotomy patients showed a physiological foot progression angle, but still walked with increased internal hip rotation. Increased internal hip rotation was assumed to be a compensation pattern to decrease excessive external foot rotation pre-op as femoral antetorsion was physiological (CT confirmed 19.9±5.8°). Further analysis is needed in the future to evaluate if either extensive gait training is needed after surgery and/or gait patterns need more time to normalize.

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V6-2

SUPER Ankle Procedure für Paley „Typ 3 b“ und „c“ fibuläre Hemimelie – mittelfristige Ergebnisse

K. Mladenov, R. Stücker, K. Ridderbusch

Questions Background data: The SUPER Ankle Procedure is currently used for the treatment of severe fibular hemimelia with ankle and foot malposition in order to achieve stable ankle joint and plantigrade foot. Reports about the results and complications with this procedure are still sparse.
Purpose: To describe our surgical protocol and to evaluate the results with focus on ankle and foot position and function.
Methods Study design: Retrospective single institution study of patient charts and X-rays of cases sustained the SUPER Ankle procedure.
Description of treatment protocol: We used the surgical technique originally described by Paley, comprising of complete removal of the rudimentary fibular remnant, resection of the talo-calcaneal coalition followed by calcaneal repositionning under the talus and a tibial osteotomy on order to correct tibial valgus and procurvatum.
Results A total of fifteen patients underwent surgery. Two were lost from follow-up. The remaining thirteen consecutive patients comprised the study cohort. In 3 patients the deformity was billateral, thus a total of sixteen feet were evaluated (n=16).
There were 3 Type 3 b and 13 Type 3 c deformities.
Mean age at surgery was 3,5 yrs (range 1,1 – 6,5 yrs)
Mean age at latest f/u was 7,1 yrs (range 3,7 – 16 yrs)
Mean duration of follow up was 4,1 yrs (range 6 mo – 13,5 yrs)
Nine patients underwent additional procedures such as tibial lenghtening and/or soft tissue reconstruction for knie instability. In the others further reconstructive procedures are pending.
At latest follow-up all patients had stable ankle joints and painless functional feet. One foot (6%) had residual valgus of 15° and three feet (18%) had residual equinus of 10° without functional impairment.
Complications related to surgery:
Incomplete correction of valgus: 1 (6%)
Need for delayed amputation due to functional impairment: none
Recurrence of deformity: none
Nerve injury: none
Compartment: none
Delayed union of tibial osteotomy: none
Deep infection: none
Wound dehiscence: 1 (6%)

Conclusion The SUPER ankle procedure is an efficient and safe technique for the correction of severe ankle and foot valgus in fibular hemimelia. The foot can be preserved and a stable, painless and functional weightbearing can be achieved.

V6-3

Verhalten die überkorrigierte Klumpfüße nach Poseti ähnlich wie die nach einer operativen Korrektur?

C. U. Dussa, H. Böhm, L. Döderlein, A. Fujak

Questions An overcorrection is a serious recognised problem following surgical treatment of a clubfoot. Lately it has been also mentioned following Ponseti treatment. The aim of the study was threefold: 1. to see if the overcorrected foot behaves similarly irrespective of the aetiology (Ponseti or surgery), 2. If the foot kinematics represents the clinical deformity and correlates with the radiological parameters of deformity, and 3. If foot kinematics guide us in the treatment planning.
Methods Overcorrected idiopathic clubfeet either following Ponseti or surgical treatment were included in this study. The feet were divided into 2 groups (Ponseti and surgery). 50 typically developing children served as controls. All subjects were subjected to clinical, and radiological examination and 3-Dimensional gait analysis using the Oxford Foot Model (OFM).
Results Results: Sixty-eight children, of these 52 in the surgical and 16 in the Ponseti group were included in the study.. Both groups showed reduced movements in the ankle and subtalar joints. The radiological parameters did not reflect the clinical deformity. There was only little correlation between the radiological and foot kinematics.
Conclusion The overcorrected clubfeet due to surgery and Ponseti treatment in spite of similar clinical appearance behave differently. The kinematic data in OFM reflect the clinical deformity but fails to correlate with the radiological parameters of the deformity. The OFM gives valuable additional information that my help in the management of these feet.

V6-4

Der Einfluss der subtalaren Arthrorise auf die Sprunggelenksbeweglichkeit: Hinweise bezüglich der Explantation

R. Rethwilm, H. Böhm, C. Dussa

Questions Subtalar arthroereisis is a common treatment for children with idiopathic flexible flatfoot (pes planovalgus) and has been shown to successfully correct excessive subtalar joint motions [1] . Still, controversy exists whether implants should be explanted or can remain. Therefore, the purpose of the current study is to investigate the rear foot range of motion (ROM) during walking to find potential indications.
Methods For the study 20 children and adolescents (39 feet; mean age 12.5±2.2 years), who underwent arthroereisis surgery and had instrumented 3D gait analysis pre- and post-operatively, were retrospectively included. Due to different implants the patients were further divided into a group with an impact-blocking device (6.5 mm screw; n=25 feet) and self-locking implant (pro stop, n=14). Additionally, these groups were compared with a group of typical developed (TD) age matched children using a repeated measures mixed analysis of variance (ANOVA) with post-hoc tests.
Results The analysis revealed significant improvements of the peak rear foot eversion with both implants (p=0.005) and no group difference pre or post-operatively (p=0.827 and

p=0.318, respectively). Further, the comparisons with the control group show that the peak eversion is still significantly lower in the screw group post-operatively (p=0.03). The rear foot inversion ROM was reduced from 11.2° (SD=3.9) to 9.3° (SD=4.0) in the screw group and from 13.5(SD=3.5) to 9.8 (SD= 4.1) being significantly different from the TD (14.6°, SD=4.2; p<0.001) post-operatively.

Conclusion The results indicate that both arthroereisis implants successfully reduce the excessive rear foot eversion but also negatively influenced the inversion ROM, which should ideally be improved to ensure healthy foot function. Despite unclear consensus at what time the arthroereisis can be removed [2] , others have shown that the positive effects remain after explantation [3]. In conclusion, an explantation of the arthroereisis should be advocated potentially leading to further foot function improvements.

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V6-5

Das Outcome nach subtalarer Arthrorise zur Behandlung kindlicher Plattfüße ist abhängig vom Therapiezeitpunkt: mittelfristige Ergebnisse von 95 Fällen

H. Kubo, B. Westhoff, H. Pilge, C. Lipp, M. Ruppert, M. Hufeland, R. Krauspe

Questions The subtalar arthroereisis (SA) is an established surgical option for pediatric flatfeet (PFF). Hence, the optimal time point for a SA is still discussed controversially. Therefore the present study evaluates the influence of the patient‘s age at surgery on the radiological outcome to provide further evidence in this matter.

Methods From 08/2007 to 12/2015 50 consecutive patients with 95 PFF were included. Inclusion criteria were: 1) Patients with flexible PFF under or equal to 15 years of age, 2) treatment with SA and 3) presence of pre-op, post-op and follow up (FU) routine biplane radiographs under full weight-bearing. Subdivision into group A: 5-8 years, group B: 9-12 years and group C: 13-15 years. The radiographs were analyzed at three different timepoints for: 1) calcaneal-pitch (CP), 2) lateral talocalcaneal angle (lat. TCA), 3) a.p. talocalcaneal angle (a.p. TCA, kite angle) and 4) navicular-cuboidal-index (NCI, overlap of Os naviculare and Os cuboideum).

Results Our study showed the best deformity correction when surgery was peformed between 9-12 years of age (group B), with significant improvement in all measured parameters without secondary deterioration during FU. In group A, the SA show inferior results with poorer long-term success with only an improvement in the a.p. TCA; the NCI even deteriorated during FU. Group C showed mixed results. While CP and NCI improved, the lat. TCA deteriorated in FU.

Conclusion In conclusion, the ideal age for surgical intervention by SA seems to be between 9 and 12 years. Therefore, surgery before the age of 8 years is no longer recommended and the younger child observation of the natural course seems to be appropriate. Delayed treatment with surgery at the age of 13-15 was only partially successful with deterioration during FU period.

V6-6

Radiologischer Korrekturverlauf bei der Calcaneus-Stop Schraube zur Behandlung des kindlichen flexiblen Knicksenkfußes – Wann korrigiert die Schraube?

G. T. Mindler, S. Kolamkuzhiyil, C. Radler, R. Ganger, A. Kranzl

Questions The subtalar extra-articular screw arthroereisis with a Calcaneo-Stop Screw has been described as an effective minimal-invasive treatment option for juvenile flexible flatfeet. The influence of growth and other factors on the amount of correction of this surgical procedure have been discussed. Aim of this study was to evaluate the course of correction during the whole treatment time, to determine the point of time of greatest radiologic changes and to detect potential loss of correction after screw removal.

Methods A prospective study of patients with symptomatic, flexible flatfeet younger than 14 years at the time of surgery was conducted. Exclusion criteria were incomplete data, association with neurogenic disorders or syndromes, as well as rigid flatfeet. Radiographic measurements of the feet in two planes were obtained before and after screw insertion and before and after screw removal. Clinical parameters as well as different radiographic foot angles were examined and correlated.

Results Radiographs of a total of 230 children with 456 affected feet were included in this study. The mean age at surgery was 11.6 years (7.8 to 13.9 years). Measurement of radiographs showed significant improvement (p<0.05) of all radiographic angles (Calcaneus-Horizontal, Costa Bertani, Talo-Horizontal, Talo-MT1-angle dp and lateral) after screw insertion compared to the preoperative values. No significant correction loss was seen after screw removal (n=219 feet). Most of the correction was obtained within six to twelfth months after the initial procedure. Seventy-four percent of the total amount of the Costa Bertani angle decrease was obtained with the initial correction measured six months after screw insertion. Similar changes were seen for other angles. However, a high rate of cases with incomplete correction were observed. The age at time of surgery did not correlate with the amount of correction.

Conclusion This comprehensive radiologic study contains the largest group of children younger than 14 years treated with the Calcaneo-Stop procedure, to the authors knowledge. Significant improvement of radiologic parameters in both planes in most of the patients were observed. However, our radiologic treatment results are less favourable compared to other reports. Contrary to these reports the main correction was seen initially after screw insertion with only a minor improvement of radiographic angle values until screw removal. Further studies need to determine causes of incomplete correction.

P01

Oberlin's Nerventransfer für eine aktive Ellenbogenbeugung bei Arthrogryposis multiplex congenita Typ 1

C. Hagemann, R. Stücker, P. Kunkel

Questions Arthrogryposis multiplex congenita (AMC) is a rare but disabling disease which affects mainly upper and lower extremities. Patients are not able to eat unassisted due to elbow contracture and nonexistent active elbow flexion and therefore insufficient hand-to-mouth range of motion. In brachial plexus palsies and other conditions, a partial nerve transfer in Oberlin's fashion from either median or ulnar nerve to the musculocutaneous nerve has proved to induce active elbow flexion.
Methods We selected 4 patients with AMC type 1 (6 extremities) out of 13 newborn patients diagnosed with AMC presented to our hospital from 2011 to 2016 to perform a nerve transfer to induce active elbow flexion within the first year of life. Inclusion criteria were active finger and wrist flexion, limited contracture of elbow joints and evidence of biceps muscle fibers detected by sonography.
Results We report results of 6 nerve transfers with a minimum follow up of at least 24 months. In this retrospective study, one extremity reached active elbow flexion motorgrade M5, one M4, three M3, and one M1 24 months after surgery.Therefore 3 patients were able to eat indepently after this procedure.
Conclusion This study proofs the concept of nerve transfer in the condition of AMC.

P02

Effekt der ventralen Epiphyseodese des distalen Femurs bei Zerebraleparese

C. U. Dussa, V. Maestri, L. Döderlein, H. Böhm

Questions Flexion contractures of the knee is common in cerebral palsy. It is one of the causes of crouch gait. Although a supracondylar extenion osteotomy is a standard Treatment, it has several disadvantages. Epphyseodesis has been used successfully to correct frontal plane deformities for a long time. It's effect on Sagittal plane deformities although known in polio, has not been enough studied in cerebral palsy. Therefore aim of the present study is to; 1. See the effect of ventral Epiphyseodesis of distal femur (FED) on the gait, 2. To compare its effect with extension osteotomy of the distal femur (FEO).
Methods A retrospective study was done in patients with cerebral palsy with flexion contractures of the knee joint. The inclusion criteria were: a diagnosis of cerebral palsy, presence of a fixed flexion contracture and crouch gait and presence of preoperative and follow-up gait analysis. Exclusion criteria were: those patients who underwent muscle lengthening and who did not have gait analysis pre or at followup. The patients were divided into 2 groups: 1. those who had ventral epiphyseodesis of the distal femur 2. those who had extension osteotomy of distal femur.
Results OF the last 112 FED's performed in last 7 years, only 11 patients satisfied the inclusion criteria due to lack of pre or postoperative gait analysis. 12 patients with supracondylar extension osteotomy (FEO) served as controls. The duration of correction in the FED group was 20.6 months (SD +/- 10.8). The mean correction was 0.48°/month. During walking the peak extension in the stance phase improved 7.7° (SD +/- 10°) in the FED group without patella advancement and 16° (SD +/- 7°) in the FEO group with patella advancement. These improvements are depicted in the kinematic curves of the gait analysis in Figure 1.

Conclusion The groups FED and FEO were similar in that they both had flexion contracture of the knee and crouch gait. Both procedures FED and FEO achieved full passive extension of the knee. Although both interventions improved the crouch gait, FEO was more effective as the patella advancement was done in all cases. This shows that the slackness of the quadriceps is an important contributing factor to the crouch gait. We perform the patella advancement at the time of removal of the 8-plates. As the torsional deformities of femur cannot be corrected with FED, it is advisable to perform FED in patients with flexion contracture of the knee. In patients with combined deformities it is advisable to perform FEO.

P03

Kinderorthopädische Erkrankungen und ihre Darstellung in der Bildenden Kunst

K. Milachowski

Questions Seit jeher haben bildende Künstler das kranke Kind zum Motiv ihrer Werke gemacht (Picasso, Munch)
Die Darstellung von Verletzungen und klassischer orthopädischer Erkrankungen in der Kindheit in der Bildenden Kunst bleibt aber bis in die Neuzeit eine absolute Rarität
Methods Es wird zunächst ein kunsthistorischer Überblick über das kranke kind in der Bildenden Kunst präsentiert. Im Speziellen wird dann das besondere Thema der Kinderorthopädie in der Bildenden Kunst dargestellt.
Ein abschließender Teil widmet sich der >Darstellung des verletzten Kindes.
Results An zahlreichen Beispielen werden angeborene und erworbene Deformierungen, Wachstumsstörungen und spezielle Erkrankungen wie die infantile Cerebralparese und der Klumpfuß in der Bildenden Kunst demonstriert.
Ebenso werden Behandlungsstrategien kinderorthopädischer Erkrankungen in ihrer künstlerischen Darstellung im historischen Kontext präsentiert (Charcot, Raffael, Venel)
Conclusion Wenngleich eine Rarität, so vermittelt die bildliche Darstellung kinderorthopädischer Erkrankungen in der Bildenden Kunst doch einen faszinierenden Einblick in die Pathogenese und Therapie dieser wichtigen Erkrankungen.

P04

Rezediv-Spitzfuß nach Verlängerung des Wadenmuskels bei Zerebralerparese

C. U. Dussa, M. Göggel, F. Meister

Questions Equinus deformity is common in patients with cerebral palsy. It may exist independently or in association with a foot deformity. Surgical correction of the equinus deformity depends on the muscle involved and the severity of equinus deformity. Recurrence of equinus deformity between 6% - 53% has been mentioned following calf muscle lengthening (CML) and is attributed to growth. The aim of present study is to investigate: 1. the rate of recurrence in relation to the region of lengthening, 2. Rate of recurrence in relation to GMFCS and type of cerebral palsy.
Methods A retrospective study was carried out to in patients who underwent surgical correction for an equinus deformity. The data was collected from the clinical examination as documented at the time of last follow-up. Patients with follow-up under 2 years were excluded. The data collected were: GMFCS, type of lengthening, time of recurrence, repeat surgery & time of follow-up.
Results Of the 260 patients who underwent lengthening of the calf muscle, 42 patients were excluded. Of the remaining 221 patients who underwent lengthening of the calf muscle, 39 (17.6%) were Hemiplegics, 150 (67.8%) were diplegics and 29 (13.1%) were

tetraplegics. The patients were classified also according to function and 27 belonged to GMFCS I, 69 belonged to GMFCS II, 58 to GMFCS III and 70 to GMFCS IV & V. The most often performed surgeries in Hemplegics were Bauman (45.5%) & Tendoachilles lengthening (TAL) (46%) and in Diplegics, Bauman (69%) and in tetraplegics, TAL (65.5%). The rate of recurrence of equinus deformity of 17% was similar in patients with functional status GMFCS II – V. Patients with GMFCS I showed the least recurrence rate with 7%. Following Zone 1 and Zone III lengthening a recurrent equinus deformity of 17.1% & 19.2% respectively was seen. The rate of revision calf muscle lengthening for recurrent calf muscle contracture was 4.9%.

Conclusion The overall rate of recurrent equinus deformity following CML was 14.6% with a revision surgery < 5%. The recurrence rates of equinus deformity was similar in patients with GMFCS II – V. The cause of the equinus deformity was different in hemiplegics, diplegics and tetraplegics. Therefore it is important to examine the patient carefully before surgical intervention to determine the muscle involved in shortening. This would avoid insufficient and overcorrection.

In diplegics isolated gastrocnemius in 69% and in tetraplegics both gastrocnemius and soleus in 65.5% caused euqinus deformity.

P05

Ergebnisse der funktionellen Ganganalyse 10 Jahre nach Single-Event Multilevel Operationen bei Kindern mit Zerebralparese

N. Hasler, R. Visscher, M. Freslier, N. Singh, R. Brunner, E. Rutz

Questions Background:

The course of disease for children with bilateral spastic cerebral palsy (BSCP) is of deterioration over time. In such cases, single-event multilevel surgery (SEMLS) has been established as a standard treatment approach. However, it is unclear whether the gait improvements are durable after this procedure and whether further gait corrections in form of SEMLS procedures are needed.

The main purpose of this study was to determine whether functional gait improvements following SEMLS in children with BSCP are sustained over 10 years. The second objective was to evaluate the numbers of required additional surgical interventions following index surgery.

Methods Retrospective patient history as well as three-dimensional gait data from 16 subjects (11 males and 5 females) aged around 8 to 23 years at time of intervention (mean age: 13.5 years), were used to analyze the primary outcomes: spatio-temporal parameters, sagittal joint angles, Movement Analysis Profile (MAP), and Gait Profile Score (GPS). All required data were collected at four pre-defined time intervals: preoperative (E0), short- (E1: up to 2 years post-index surgery), mid- (E2: up to 6 years post-index surgery) and long-term (E3: 8 years and more post-index surgery) follow up. Statistical parameter mapping (SPM{F}, post-hoc SPM{t}) and repeated measures analysis of variance model (rm-ANOVA, post-hoc Bonferroni) were used to analyze the data. For all procedures significance was set to α=0.05.

Results SPM revealed that all sagittal joint angles, except ankle dorsiflexion, were significantly influenced by the SEMLS. All results showed to be durable over the average follow-up period of 10.7 years (range 8–14 years). In total, patients had undergone 151 operative procedures, with 117 performed as index and 34 as additional surgeries. Further surgical interventions, 13 (3 after E1, 8 after E2, 2 after E3) respectively 21 in the number of procedures, were required in 10 patients due to relapse (5 patients), new developed biomechanical problems (7 patients) or other problems (1 patient).

Conclusion To our knowledge, this study will be one of the first providing novel long-term functional outcome evaluations of SEMLS in BSCP. While the effects of SEMLS on the sagittal joint angles were durable over a period of 10 years, the need for additional surgery after E1 was required for more than half of the subjects of our cohort.

P06

Schwere Knickfußdeformität nach der Korrektur eines Pes Cavus

F. Meister, C. U. Dussa

Questions The aim of the poster is to show the complication following the correction of a neurogenic cavus foot in cerebral palsy.

Methods A 10 year old boy with ICP GMSCF level II underwent a operation of the cavus foot with Steindler OP, transfer M. peronaeus longus to brevis, Osteotomy os cuneiforme mediale 10/2016.

Results Two after the peroneus longus to brevis transfer and Steindler OP the patient has a severe planovalgus foot.This happened inspite of the fact that the Patient was treated with AFO the last two years. The foot deformity progressed and is now causing presssure sores on the medial side of the foot.

Conclusion Is the peroneus longus transfer and Steindler OP in patients with cp a reasonable treatment for cavus foot deformity? The poster will be presented to elucidate the possible mechanisms of the cavus deformity of neurogenic origin and possible biomechanical reasons for an overcorrection. The poster will also demonstrate a rare primary foot deformity in cerebral palsy. This iatrogenic deformity highlights the fine balancing mechanisms when disturbed will result in a secondary deformity which is more incapacitating than the primary deformity. Therefore the poster will discuss the possible treatment methods of the cavus deformity in cerebral palsy and to discuss the possible treatment options available to treat the severe flatfoot deformity due to overcorrection.

P07

Analyse der Inzidenz von fokalen periphysären Ödemen (FOPE), eine retrospektive Studie

M. Ban, J. Wansch, R. Biedermann, I. Dornauer, D. Junker, B. Sztankay

Questions Focal periphyseal edema (FOPE) in adolescent knee joints with open physis is known since its first description in 47 cases by Zbojniewicz in 2011. Because of the nescience of this diagnosis, the aim of this retrospective study was to analyze the incidence and also to correlate FOPE with pain and the ensuing treatment performed to avoid future misinterpretations of this purely radiological diagnosis, as well as unnecessary invasive treatments.

Methods A total of 1201 knee MRI images of 897 patients, performed between 2007–2016 at the Department of Orthopedics and Traumatology (Medical University Innsbruck) were evaluated retrospectively. The cases were analyzed and classified according to the underlying causes in trauma-associated, unclear knee pain without trauma or other pathologies. All knee MRI´s were evaluated retrospectively by a radiologist in terms of the existence of a FOPE lesion. The initially leading diagnoses, other coexisting reasons for knee pain as well as the chosen therapies were documented.

Results Out of the 897 patients analyzed, 97 FOPE zones (97/897; 10.81%) were identified in 93 patients (93/897; 10.37%). FOPE being the sole diagnosis causing knee pain was

found in 52 patients (52/897; 5.8%). In 84 patients (88/93; 94.62%), FOPE lesions were associated with knee pain. In 79 patients (79/93; 84.94%) a conservative therapeutic approach (physiotherapy, pain medication, rest, knee brace) was performed; in 14 patients (14/93; 15.05%) an invasive treatment plan was decided.
Conclusion FOPE lesions are – despite the nescience of this etiology – a common, self-limiting, gender-independent and painful entity. No invasive treatment reportedly is needed and lesions heal without consequences after physiological closing of the physis. This purely radiological diagnosis should not be misinterpreted as a pathology requiring treatment and be considered as a differential diagnosis of knee pain in the adolescent age.

P08

Funktionsstörungen der oberen Halswirbelsäule – die außerordentliche Rolle von Atlas und Axis für die Entwicklung unserer Kinder. Wissenschaft? Fiktion?

H. Spittank

Questions Despite the fact that numerous growing kids profit from responsible manual medical interventions (chiropractic, osteopathic etc.) targeting the upper cervical spine worldwide, the existence of the so called upper cervical dysfunction is still negated at least considered questionable in childrens orthopedics. On the one hand, the therapists persistently want to claim a causal connection between the result and the therapy that has been carried out - on the other hand, the observers criticize a mismatched connection between treatment / treatment succes and refer to random phenomena of the children's development taking place anyway.
Which party is right now? How do we want to approach the problem in times of evidence-based medicine? Can we even expect to generate adequate results at study level? What if we only succeed but cannot proof?
The author is trying a (self)-critical analysis!
Methods s. a.
Results s. a.
Conclusion s. a.

P09

Mukopolysacharidose Typ VI als seltene Ursache für Gelenkschmerzen bei einem 8-jährigen Mädchen.

U. W. Grün

Questions Mucopolysaccharidosis type VI (Maroteaux-Lamy-Syndrome) is a rare lysosmal deposit disease (prevalence 1-9/1.000.000). Manifestation begins in childhood with a progressive course and multi-organ disease caused by deposit of dermatane sulfate due to a lack of Arylsulfatase B. Because of the variety of clinical symtptoms diagnosis is often postponed. Therefore besides a sound and careful clinical examination the possibility of lysosomal deposit disease should be taken into consideration in all patients with untypical musculo-skeletal symptoms.
Methods A 8 year old girl with progressive bilateral shoulder pain combined with decreased shoulder mobility was presented in our hospital with X-rays of both shoulders that showed cystic bone lesion in both proximal humeri with the working diagnosis of bone tumor.
Results Clinical examination revealed facial dysmorphia (hypertelorism, prominent forehead and sunken root of the nose), a decreased symmetrical ROM of both shoulder joints and a bilateral lack of extension of the fingers, splenomegaly.

Length 1.22cm (6.percentile). X-ray of the hands demonstrated short metacarpal bones. Laboratory examination demonstrated a decreased activity of Arylsulfatase A and increased renal excretion of dermatane sulfate. In conclusion mucopolysaccharidosis type VI (Maroteaux-Lamy-Syndrome) was diagnosed. Treatment with Galsulfase was initiated.
Conclusion The presented case emphasizes the importance of a careful clinical examination in all patients with musculo-skeletal symptoms. Rare diseases as the lysosomal deposit diseases have to be taken into consideration in all cases of untypical musculo-skeletal complaints to make the correct diagnosis.

P10

Die orthopädische Versorgung von Erwachsenen mit geistiger und/oder mehrfacher Behinderung in Deutschland: Erste Erfahrungen aus unserem MZEB

B. Schnuck, F. Bösebeck

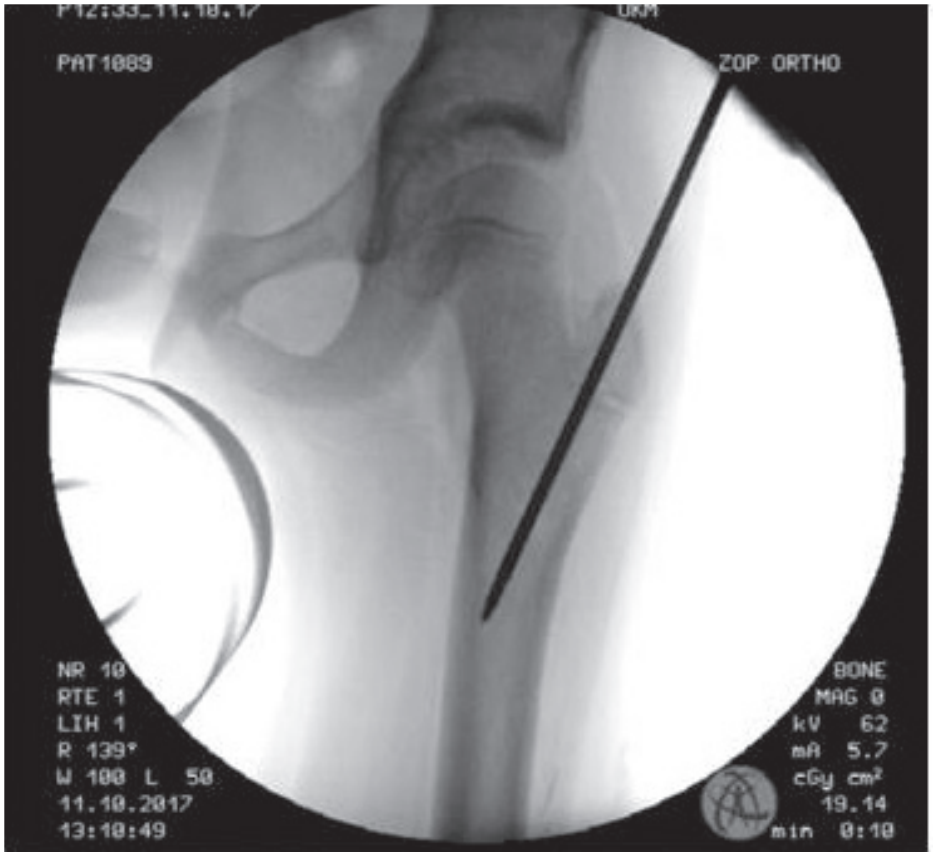
Questions Mental disabilities and interfering comorbidities belong to the most common developmental disorders worldwide. In industrialized countries moderate to severe impairments are present in about 6 to 10/1000 adults and 3 to 14/1000 children, respectively. The medical support for this particular patient group means a considerable cross-national challenge for current medical healthcare systems. Despite the principal requirement of inclusion of people with disabilities in all parts of our social cohabitation, specialized and economically adequately equipped institutions are necessary. According to the UN Convention on the Rights of Persons with Disabilities (that Germany ratified in 2009) this should not be restricted to the opening of the current care landscape for people with mental or multiple disabilities. In this concern, one of the most challenging tasks is to find satisfactory solutions for the barrier-free transition and integration of adolescent patients with disabilities into non-pediatric medical care systems.
Methods Flanked by legislative changes, more than three decades of experience with the interdisciplinary and multi-professional approach of social pediatric centers (SPZ) in Germany recently led to the establishment of administrative and structurally comparable Medical Centers for Adults with Disabilities (Germ. abbrev.: MZEB). In terms of content, the vast majority of these new facilities are devoted to the most common concomitant diseases of people with disabilities, namely epileptic seizures, behavioral disorders, and complex, chronic orthopedic disorders. In this concern, the experience shows that the course of those disorders in inherited or early-acquired injury mechanisms often differs significantly from those acquired in adulthood.
Results Using the example of orthopedic disorders of congenital or early acquired origin, the lecture presents first data of a singular MZEB in terms of (a) medical issues, (b) expectations of the affected persons as well as their caregiver and (c) resource-related data. Furthermore, a brief overview of the current development of MZEB in Germany is presented.
Conclusion MZEBs are an essential structure in our healthcare system to include adults with disabilities and facilitate specialized interdisciplinary medical care. Cross-institutional communication is needed to provide professional and standardized medical care for this population.

P12

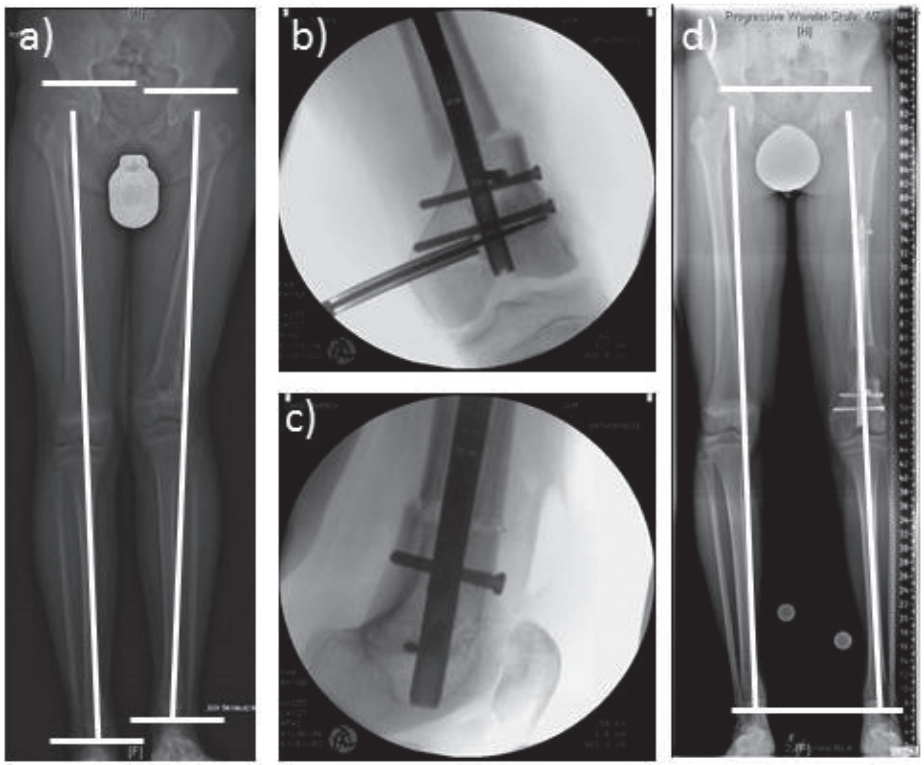
Extremitätenverlängerung und -rekonstruktion mittels intramedullärer Verlängerungsmarknägel bei Kindern- und Jugendlichen

A. Frommer, R. Rödl, G. Gosheger, J. N. Bröking, A. Laufer, A. Rachbauer, G. Toporowski, B. Vogt

Questions Limb lengthening and deformity correction with motorized intramedullary lengthening nails (MILN) is a more comfortable and equally safe procedure than the use of external fixators. While this treatment is a well-established method in adults, intramedullary nailing for skeletally immature patients remains a challenge and is part of current clinical investigations.
We aim to further elucidate the indications for applying femoral and tibial lengthening nails in skeletally immature patients and depict essential characteristics and limitations of the treatment.
Methods A retrospective review was performed between 2016 and 2018 to determine skeletally immature patients who had a lengthening nail inserted through either an antegrad/retrograde femoral (AF/RF) or antegrade tibial (AT) approach.



The lateral trochanteric entry ensures that the blood supplying vessels of the femoral head are not injured by the insertion of a nail.



RF implantation of a MILN and permanent epiphysiodesis of the distal medial femur in a 13-year-old boy with LLD and valgus deformity due to posttraumatic growth plate injury (a-c). Corrected leg length and deformity 11 months postoperative (d).

Results 60 procedures have been performed on a total of 54 patients. Mean age at the time of surgery was 13.8 years. Different nailing approaches were used: antegrade femoral (n=42), retrograde femoral (n=10), and antegrade tibial (n=8). The average amount of lengthening was 45mm. In 58/60 cases (96.7%) the desired amount of lengthening was achieved, while two patients experienced complications that required interruption of the treatment. None of the patients developed complications associated to the nailing approach.
Conclusion Different approaches for intramedullary lengthening nails can be used in children and adolescents to correct leg length discrepancy (LLD) with or without concomitant deformities. The treatment is limited by the size of the available nails, the residual growth and characteristics of the deformity. Larger trials will be needed to further validate the application of lengthening nails in skeletally immature patients

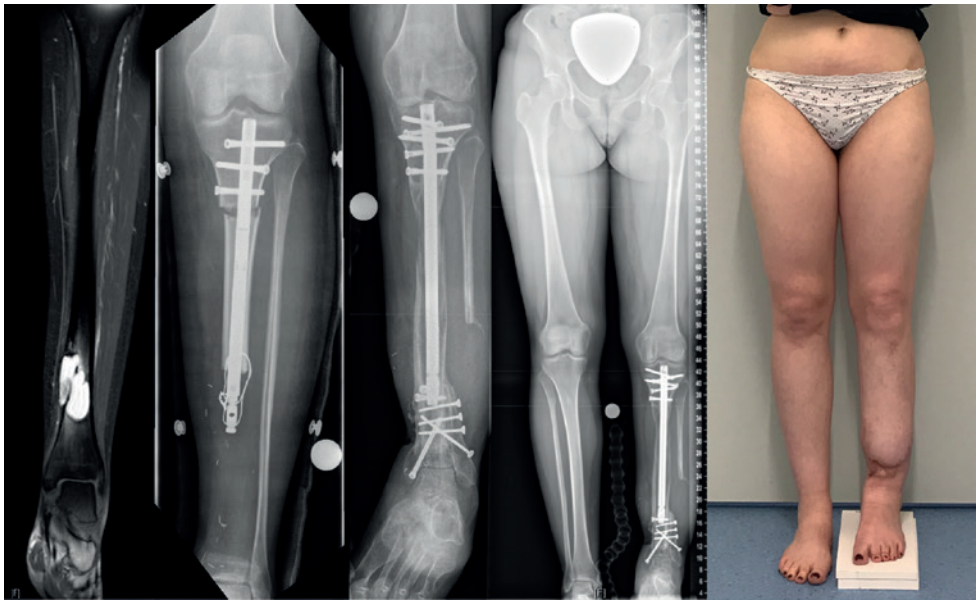
P13

Fibula-gestützer Segment-Transport in der Adamantinombehandlung

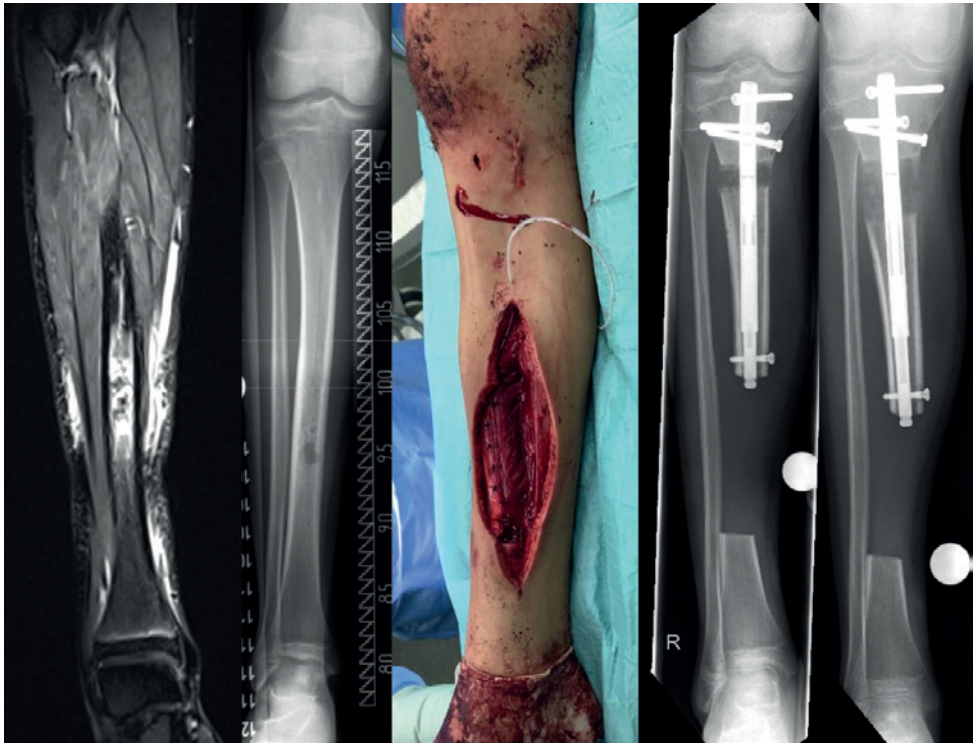
A. Rachbauer, R. Rödl, G. Gosheger, N. Bröking, A. Frommer, A. Laufer, G. Toporowski, B. Vogt

Questions Segmental bone transport is often used to treat long bone defects (e.g. tumor, congenital, trauma or infection).
Adamantinomas, rare bone tumors commonly affecting the tibia, are treated by wide resec-

tion. As they usually do not infiltrate the fibula and the soft tissues, the fibula can be used to reconstruct the resected tibia. This is mostly accomplished using a vasculized fibula transfer.
Plate assisted segmental bone transport – PABST uses a magnetic limb lengthening system utilizing a plate for segment transport.
We report on the early results of a new technique of segmental bone transport using ipsilateral fibula as a biological bone plate.
Methods Two patients suffering from adamantinoma of the tibia were reviewed using Fibula-assisted segmental Bone Transport following wide resection.
Results Patient OL, female 24yrs, was treated by resecting 15 cm of distal tibia in 08/16, followed by osteotomy of the proximal tibia and antegrade insertion of a PRECICE nail (NuVasive). Lengthening started at the 10th postoperative day. Docking was done following the second nail change. Another change of the nail to lengthen for 4 cm is planned.



Patient CF, male 15yrs, received the resection of 11 cm of the right tibia in 08/18, followed by proximal osteotomy and antegrade implantation of a PRECICE nail. Following a distraction of 5 cm a change of the nail is planned to distract until docking at the distal part can be achieved.



External stabilization during bone transport was provided by a cast, followed by orthosis.
Conclusion Using the fibula as plate to guide the intramedullary nail for bone segment transport is a good and elegant option for reestablishing leg length in cases of long tibia defects, like following wide resection of adamantinomas.
In addition the perioperative hazards attributed to fibula transfer from contralateral side might be avoided.

P14

94% erreichte Distraktionslänge beim Auszug von extern magnetisch kontrollierten Stäben zur Behandlung kindlicher Wirbelsäulendeformitäten

H. M. Lorenz, L. Braunschweig, K. Tsaknakis, J. Grote, A. K. Hell

Questions In children with severe spinal deformity early surgical intervention may be required. In the last decades, several growth friendly implant systems have been established, such as the magnetically controlled growing rod (MCGR) system. The aim of this work was to evaluate the ratio between achieved and expected distraction length. Furthermore, the complication rate and its risk factors as well as the correlation of the distraction length and the spinal length were analyzed.
Methods The study included 802 external lengthening procedures in forty patients with an average follow-up of 34 months. Children underwent magnetically controlled lengthening procedures every three months. The discrepancy between the distraction lengths was determined by comparing the measured distraction length of the rod on radiographs with

the distraction length displayed on the external remote controller for the MCGR. Age, weight, height and complications were repeatedly recorded.
Results The actual distraction was shown to be 94.4% of the expected one. No differences between implants on the concave and convex spinal side were observed. Strong correlation between achieved implant distraction length and gain in the length of the spine could be proven. The complication rate was 4.6% (35 complications in 802 interventions) mainly due to failure of the implant or lack of implant extension, which was directly related to an increased body mass index.
Conclusion This work demonstrates a high ratio (94.4%) between achieved and expected distraction length of magnetically controlled spinal rods. The complication rate was low and correlated to a high body mass index. The correlation between the achieved implant distraction length and spinal length indicates the efficiency of the MCGR therapy.

P15

Primärkorrektur bei Skoliosen im Kindes- und Jugendalter durch Einleiten einer Korsettbehandlung

K. Tsaknakis, L. Braunschweig, H. M. Lorenz, A. K. Hell

Questions In adolescent idiopathic scoliosis (AIS) an effective brace therapy requires a primary curve angle reduction of 50% after the first orthotic bracing. The aim of the cross-sectional study was to determine the efficacy of conservative Chêneau brace therapy for scoliosis with a curve angle above 20° and to determine possible influencing factors.
Methods A cohort of 110 ambulatory scoliosis patients with conservative Chêneau brace therapy was included. The development of the scoliotic curve during brace therapy was documented for an average of 40 months. Influencing factors such as the initial Risser sign, age at beginn of therapy, gender, curve patterns and body mass index were analyzed.
Results The collective consisted of 88 patients with idiopathic and 22 with neuromuscular spinal deformities. At the beginning of the Chêneau brace therapy, the average age was 12.2 ± 2.8 years with a mean scoliosis curve angle of 30.4° ± 12.5°. The primary brace reduced the scoliotic curve by 31% to 20.9°. In children and adolescents with lower maturity status (Risser 0, no menarche), the success of brace therapy was greater than in skeletally more mature patients (higher Risser sign). Children with idiopathic and neuromuscular scoliosis initially exhibited identical correction potentials, which then worsened over time in the neuromuscular group. In addition, children with obesity had less success during brace therapy than normal- or underweight children.
Conclusion The initial curvature correction of 50% required for effective brace therapy in AIS, could only be achieved in one third of our patients. On average, the correction was 31%.

P16

Veränderungen der Morphologie von Wirbelkörpern und Bandscheiben unter der Behandlung mit Magnetstäben

S. Stücker, P. Kunkel, C. Hagemann, K. Mladenov, R. Stücker

Questions Reports in the literature suggests that changes in vertebral morphology may occur after treatment with traditional growing rods or VEPTR. However, there are no such reports following treatment with MCGR. This study was undertaken to analyze changes of morphology of disks and thoracic and lumbar vertebrae following treatment with magnetically controlled growing rods (MCGR).

Methods 30 patients, 21 girls and 9 boys, who were treated with MCGR for EOS were included in the study and compared to a matched control group of 19 patients (12 girls and 7 boys) which was treated by observation or bracing. Age at surgery was 8+9 (4+7-11) years compared to an onset of treatment at age 7+9 (3+6-10+4) years in the control group. Mean f/u was 45 months (24-56 months) in the surgery group vs 42 months (24-65 months) in the control group.
Calibrated x-rays were used to digitally measure vertebral and disk hight as well as vertebral body depth and width immediately after the index surgery or at onset of treatment in the control group and at most recent follow-up. Length, width and depth of lumbar and thoracic vertebra and disks under distraction were compared to lumbar motion segments below the instrumentation and to the control group.
Results There is a significant increase of lumbar vertebral height under distraction compared to vertebrae and disks below instrumentation but not to the control group. Lumbar disk height with distraction is significantly reduced compared to disks below instrumentation and in the control group. Lumbar vertebral width under distraction is also significantly reduced at follow-up compared to vertebrae below instrumentation and vertebrae in the control group, while depth of lumbar vertebrae is not significantly affected by distraction. The ratio lumbar vertebral height/lumbar disk height also shows a significant increase compared to motion segments below instrumentation and to the control group. Morphology of thoracic vertebrae and disks is not significantly changed with distraction.
Conclusion Significant changes of morphology of lumbar vertebra and disks are observed under distraction with MCGR compared to segments below instrumentation and to the control group. The rigidity of the thorax seems to protect the thoracic vertebra from overgrowth and seems to protect the disk spaces from significant loss of height.
Treatment with MCGR results in significant changes of disk and vertebral morphology especially within the lumbar region

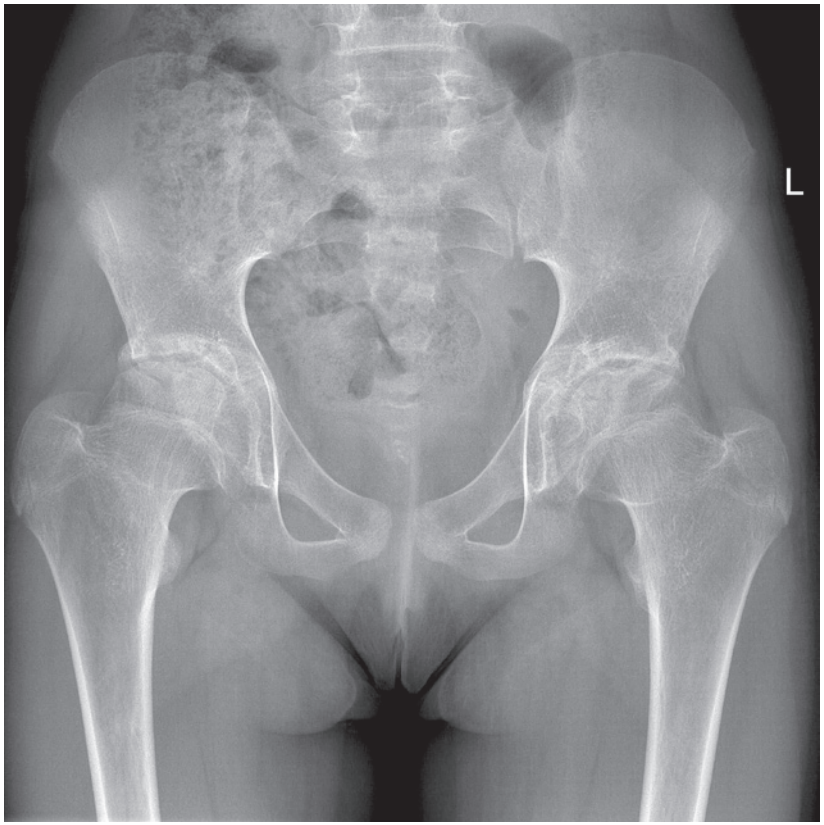
P17

Idiopathische Chondrolyse beider Hüftgelenke bei einer adoleszenten Patientin

E. Schumann, F. B. Kübler, C.-E. Heyde, A. Roth

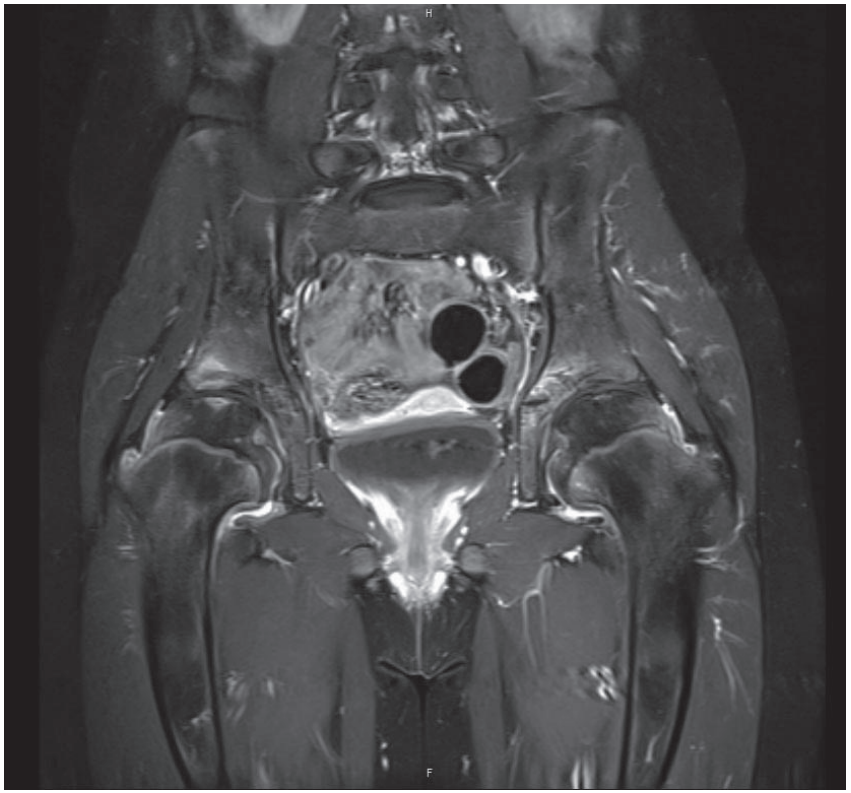
Questions A case of a 12 year old female patient with bilateral high functional defiency of the hips is presented. The patient suffered from moderate pain. Furthermore any kind of trauma or infection were not evident in patients history. Family history was negative for chronic joint disorders.

Methods Examination showed a normal gait pattern as well as straight leg and pelvic alignment. There were no deformities of the spine. Both hips were without any relevant pain during local pressure, axial compression and movement. Range of motion was measured with E/F: 0-0-90°., Ab/Ad: 30-0-30° and ER/IR: 20-10-0° for both hips. The x-ray of the pelvis showed cysts in both femoral heads and the acetabulum combined with joint narrowing in terms of a secondary arthitis of hip.



X-ray of the pelvis with cysts in both femoral heads an signs of a secondary arthritis

MRI presented specific alteration in T1 and T2 with edema of bone marrow and chondral defect.
Signs of an infection, necrosis of hip, rheumatic deseasis or other systemic causes were not found.



MRI of the pelvis with edema of bone marrow and chondral defects

Results The case presents a bilateral idiopathic chondrolysis of hip. A bilateral manifestation is uncommon and seldom published so far. A causal therapy is not described. A basic approach is functional treatment combined with analgetics and physical therapy. Botox injections and immunosuppression have been described as successful in rare cases. Surgery options are resection of joint capsule and release of muscles in case of contracture. Cases with spontaneous remission have been published as well, but progressiv chondrolysis often results in secondary arthrtis of the hip.

Conclusion Idiopathic chondrolysis of hip should be considered as differential diagnosis in patients with pain or functional disorders of hip. The diagnosis can be confirmed by MRI and its specific T1 and T2 alterations. A cause of the desease is not known yet. Immunological causes have been discussed.

P18

Fulminanter Verlauf einer septischen Coxitis mit PVL-produzierendem Methicillin resistenter Staphylococcus aureus bei einem 14-jährigen Jungen

M. Reinke, K. Studer, V. Exler, E. Payne, H. Klima, A. Niederer, C. Kahlert, H. Lengnick

Questions Septic coxitis is a critical disease, threatening cartilage damage of the hip joint. Depending on the aggressivity of bacteria, life threatening state can be observed with sepsis and multi-organ failure.

Early diagnosis is crucial to preserve the affected Joint.
Panton–Valentine leucocidin (PVL) is a cytotoxin produced by some strains of Staphylococcus aureus, the most frequent pathogen in septic arthritis.
Methods A 14 year old boy presented at the emergency department with pain in the hip, limping and fever for one day. He mentioned banal trauma few days before with a football against the right thigh.
Results Clinical examination showed painful reduced rotation of the hip. In blood test inflammatory parameters (CRP 161mg/l, BSG 27mm/h) were increased. Due to the absence of joint effusion in ultrasound, the patient was sent home. Pain and fever persisted under pain killer and respiratory problems occurred.
X-ray of the lung was conspicuous for pneumonia, i.v.-antibiotics were started two days later by paediatricians.
MRI was performed because of persisting fever and immobilising pain of the right hip. It showed osteomyelitis of the proximal femur with intraarticular fluid. Septic coxitis was confirmed by joint puncture (cell count >50 000/ul). Open lavage of the hip joint was performed using a ventral approach and antibiotic treatment with flucloxacillin was started. Microbiological examination showed MRSA therefore antibiotics were switched to clindamycin and doxycycline i.v.Due to a thrombosis of femoral arteria, Clexane was adapted to a therapeutic dose, leading to voluminous hematothorax with life-threatening restriction of lung function. Emergent thoracotomia and hematoma evacuation by paediatric surgeons stabilized the situation.
Recurrent joint fluid with pus and permanent elevation of CRP made several joint lavage necessary. Osteonecrosis of the proximal femur was treated two times by curettage and local application of bone cement including Gentamycin. Antibiotics were adapted to Linezolid i.v. for six weeks.
Non-dislocated femoral neck fracture induced by the osteonecrosis was treated by local spongiosa plastic and osteosynthesis with locking plate five months later.
Conclusion PVL producing MRSA can lead to fulminant septic osteoarthritis, but also for sepsis associated impairment of clotting system (embolism of lung, vein thrombosis). Due to destructive PVL MRSA tissue behavior,early agressive treatment should include frequent joint lavage and extensive bone curettage.

P19

Die Apophysitis am Trochanter major – Eine seltene aber typische Entität bei jugendlichen Athleten

H.-J. Hellmich, R. Brunner, A. Krieg

Questions Traction apophysitis of the lower limb is very common in skeletally immature athletes. Weakness of the apophysis and repetitive overuse can lead to a variety of problems. In most cases we see an imbalance between the strength of the tendons and their attachment to the bones. The Osgood-Schlatter disease, the Sinding-Larsen disease, the iliac apophysitis and avulsion fractures are well known. However, there are only a few hints regarding the isolated apophysitis of the greater trochanter in the literature.
Methods We present the case of a 14-year-old, slim and muscular boy with a 6-month history of slowly increasing pain at the right hip. He was an ambitious hockey player. No history of trauma or inflammation. Clinical examination except the right hip was quite normal, no deformity or malalignment. Mild tenderness over the greater trochanter, no swelling, full range of motion and normal gait pattern was found. There was only mild pain during adduction of the hip and the impingement test in flexion, adduction and internal rotation was noted slightly positive.
Following differential diagnosis were included: simply physical overload, stress fracture, bursitis trochanterica, arthritis , initial slipped capital femoral epiphysis or a labral lesion of the hip.
Results Sonographic evaluation showed no abnormalities. Standard pelvic x-ray revealed a widening of the right trochanteric physis with adjacent bony sclerosis, suggestive for a chronic stress injury respectively traction apophysitis of the greater trochanter.
Additional MRI-Scan shows high signal intensity of the greater trochanter apophysis. The hip joint itself was healthy, in particular the labrum structure.
Treatment is based on the experience of other apophyseal disorders. Rest from sport for several weeks, temporary medication of NSAR, gradual return to activity supervised by physiotherapy. Patients can expect to reach their desired sporty resilience after 3–6 month. However, if this regime is insufficient, an epiphyseodesis could be done.
Conclusion Reported cases of the apophysitis of the greater trochanter are rare, which is actually surprising. As already described by Iman et al, later on by Heimkes et al, we can find a complex interaction between the gluteus medius and vastus lateralis muscle during gait movement, which minimizes the stress across the trochanter apophysis. So the rarity of this problem gives us a note of the fundamental importance of muscular balance.

P20

Septische Coxitis im Kindesalter – Was ist besser: Arthrotomie oder serielle Punktionen und Lavage? Eine multifaktorielle Analyse

E. Cohen, B. Mazilis, Y. Klasov

Questions Background. Bacterial septic arthritis of the hip (SAH) is most common septic joint condition during growth. SAH in children carries a significant risk of long-term sequelae: growth plate damage and limb length discrepancy, joint subluxation or dislocation, osteonecrosis of femoral head, sepsis. The treatment of SAH includes proper antibiotics and early drainage. The options for drainage are: repeated needle aspiration-lavage, arthroscopic drainage, and arthrotomy. It is controversial which method is better.
The aim of the study was to investigate serial needle aspiration-lavage versus formal arthrotomy and drainage in treatment of SAH.
Methods Patients and Methods This is a retrospective study of 80 children hospitalized at a tertiary care, university medical center during 2006–2015 who underwent a surgical intervention due to SAH and were available for evaluation. Either arthrotomy or aspiration-lavage were done in the first 16 hours after admission. The following parameters were searched: a) quality of the scar, b) 24-hour postoperative pain, c) length of hospital stay, d) complications
Results Results a) Quality of the scar was evaluated by the Patient and Observer Scar Assessment Scale (POSAS). The score is based on a questionnaire on scar features as seen by patient and caregiver. In our series 86.3% of patients reported excellent results. b) 24-h postoperative pain evaluated by Visual Analog Scale (VAS) as it appeared in nursing records. The mean VAS (1–10 scale) was 5.15±1.25 in arthrotomy group and 4.33±1.18 in aspiration-lavage. Similar between groups.
c) Mean hospitalization length was 7.26 days in arthrotomy group and 6.09 in aspiration lavage. Similar between groups.
d) Complications. Need for a 2nd arthrotomy or abandon of aspiration-lavage in favor of arthrotomy was considered a complication. A case of Osteonecrosis was recorded after aspiration-lavage.The complication rate was higher in the aspiration-lavage compared with arthrotomy group:8.8% vs. 26.7%. (Table 01)

Conclusion Conclusions: After arthrotomy the scar is usually without discomfort. It has to be out-weighted against the high rate of complication in the aspiration-lavage group. Our results support early use of arthrotomy, just few hours after diagnosis as the safest method of drainage in the management of pediatric SAH.

P21

Acetabuloplastik nach Dega mit Implantation eines xenogenen Spongiosablockes (Tutobone) zur Behandlung von Kindern mit Hüftdysplasie: Klinisches und radiologisches Outcome

N. Stiel, M. Moritz, F. von Sivers, R. Stücker, A. Spiro

Questions Dega pelvic osteotomy is a common procedure in patients with cerebral palsy (CP) who need hip reconstructive surgery due to hip displacement. There are different studies focusing on the use of autografts or allografts to fix the osteotomie gap. However, there has been no study so far checking the use of xenografts like Tutobone by Dega pelvic osteotome. This study investigated the outcomes of Dega pelvic osteotomy using Tutobone xenograft in patients with cerebral palsy and hip displacement.
Methods This is a retrospective study including 100 patients who had been treated by hip reconstructive surgeries with Dega pelvic osteotomy and the use of Tutobone xenograft. We reviewed the medical reports to analyze complication rates and examined the preoperative and postoperative follow-up radiographs with regard to acetabular index, migration percentage and neck-shaft angle.
Results All patients showed radiological union at the final follow-up without a significant loss of correction during follow up examinations. Furthermore no graft-related complications could be found.
Conclusion Dega pelvic osteotomy with the use of Tutobone xenografts seems to be an effective method in the treatment of hip displacement. The correction potential of acetabular dysplasia remained stable during the follow-up examinations.

P22

Operative Behandlung eines Tibiadefektes mit Fibula-pro-Tibia Operation und Fußkorrektur

M. Bajic

Questions Tibial hemimelia (TH) is a rare congenital disorder of the tibia characterized by a shortened or absent tibia and relatively unaffected fibula. It is often associated with a leg length inequality, malalignment of the leg, instability of the knee and ankle joint and deformities of the feet (usually in equino-varus position). This has been estimated to be 1 in 1 million live births, making it one of the rarest congenital lower-limb deformities seen.
Methods We introduce you to the treatment strategies as well as present the results of the case of one female patient, with a 4q28 microdeletion syndrome and with TH type II by Kalamchi und Dawe.
Since the age of 2 the patient was provided with an adequate orthosis in order to enable the verticalisation. The surgical algorithm was: 1.To establish the integrity of the tibia and 2. correction of the sever equino-varus foot position.
Results At the age of 4 we have carried out the fibula-pro-tibia operation using an external fixator. The fibula was transferred to the tibia at the level of agenesis of the tibia. However the X-ray has showed incomplete bone fusion between the fibula and tibia.
At the age of 5 we have carried out the permanent epiphysiodesis of proximal fibula due to overgrowth of fibula.

At the age of 6 we have performed the correction of the severe equino-varus. We have shortened the distal fibula and have undertaken a dorsomedial release of soft-tissue. Using an external fixator the foot was corrected out of its deformed position and then distracted to bring the talus below the distal part of fibula. The correction was carried out until the lateral radiographs showed that the foot is fused at the ankle in a plantigrade position. We protected correction of deformity with cast bracing for 2 months. Afterwards the patient was supplied with an orthosis. Weight bearing was not allowed for the first 60 days.
At the age of 8 we have undertaken the fibula-pro-tibia operation using an external fixator in order to re-establish the integrity of the tibia. Due to proximal migration of the fibula at the knee we also brought the fibula down at the level of the knee joint. After removing the fixator the result was protected with cast bracing for 2 months. Due to instability of the knee joint the patient has to use a supporting orthosis.
Conclusion The restoration of the full weight bearing leg was achieved. The reconstructive options for TH type II nach Kalamchi und Dawe should be preferred treatment choice instead of amputation.

P23

Der unbehandelte Klumpfuß – Extreme Lambrinudi Arthrodese mit doppelter Schnittführung

A. Helmers, M. Axt

Questions The neglected clubfoot can only be treated with a lot of surgical experience. This deformity needs a major correction which can compromise the blood circulation and wound healing. The extreme Lambrinudi arthrodesis with a double incision is therefore one of the best tools to correct a severe neglected clubfoot.
Methods From 2006 to 2015 a total of 211 clubfeet were surgically treated in Chalsa/India by two main surgeons. The patients' age ranged from 6 month to 14 years.

2006 young children where mainly treated by soft tissue release with a Cincinnati approach and older children by talectomy. With that treatment, a good correction of the deformity was achieved many patients suffered from side-effects such as skin necrosis and dorsal infection. In 2009 the treatment and approach was changed following a paper of Norgrove Penny printed 2006 in which he recommends a double incision combined with a Lambrinudi arthrodesis for severe clubfoot deformities. With the dorsomedial incision, the soft tissue release can be easily done while the lateral incision makes it possible to take out the dorsolateral wedge for the bony correction. In that way the tissue and the bony deformity can be corrected.
Results 2006: 3 tenotomies/15 soft tissue release/14 talectomies, five skin necroses and two dorsal infections of the hind foot.

2009-2015: 2 talectomies/94 Ponseti tenotomies/ 31 soft tissue release/68 Lambrinudii arthrodesis: no infection at all in cases of severe clubfoot treated with the double incision and Lambrinudi arthrodesis.

In conclusion 211 clubfeet were treated from 2006 to 2015 by different treatment methods. The rate of infection was completely reduced treating severe neglected clubfeet by the double incision technique and Lambrinudi arthrodesis recommended by Norgrove Penny. All together we had 25 over corrections and 7 under corrections.
Conclusion The Lambrinudi arthrodesis with a double incision is one of the best tools in neglected clubfoot treatment. In contrast to the talectomy, the talar dome is preserved and

can articulate perfectly with the joint part of the tibia. The double incision keeps the dorsal skin in a good condition and therewith reduces infection risks.

In conclusion 68 extreme Lambrinudi arthrodesis have been done from 2009-2015 in Chalsa/Westbengal with a double incision without any major infection and at the end with a good cosmetic and functional result. All patients can wear normal shoes and are active in their daily life.

P26

Kurzzeitergebnisse der Refixation von instabilen Osteochondrosis dissecans und osteochondralen Läsionen mit resorbierbaren Magnesiumspins

O. Jungesblut, M. Moritz, J. Berger-Groch, R. Stücker, M. Rupprecht

Questions Background: Arthroscopic fixation of unstable osteochondritis dissecans (OCD) lesions and refixation of osteochondral fragments are frequently performed surgical procedures in pediatric orthopedic surgery. Therefore, various implants can be used. Magnesium alloys have recently been re-discovered as biodegradable implants in surgery.
Purpose: MAGNEZIX® Pins are the world's first approved/CE-certified magnesium-based implants designed for use in biodegradable osteosynthesis applications in humans. This study focusses on challenges and current short-term clinical results achieved by means of degradable pins.
Methods Methods: All patients were treated by diagnostic arthroscopy of the knee and refixation of unstable OCDs or osteochondral lesions with Magnesium pins. The surgical procedure itself and a short term follow-up with nine patients were analyzed. Follow-up period was 13.71±1.60 weeks.
Results Results: 6 girls and 3 boys aged 13.88± 1.60 years had surgery with diagnostic arthroscopy of the knee and refixation of OCDs or osteochondral lesions using biodegradable Magnesium pins. The mean size of OCD lesions was 2.2±0.71cm in the sagittal plane and 1.42±0.53cm in the coronal plane. On average 3,22 pins were used per patient and duration of surgical procedure was 55,5±30,82min. No intra-operative complications occurred. No X-ray was used. After a time period of twelve weeks one patient had a broken pin after forced physiotherapy and needed surgical revision. The other patients were completely pain-free with free range of motion and regular healing demonstrated on x-rays.
Conclusion Conclusions: In short-term follow-up of nearly 14 weeks MAGNEZIX® Pins provide high stability following refixation of osteochondral lesions and ensure adequate healing as demonstrated on radiographs. No intra-operative complications occurred. One of overall 31 pins was broken after twelve weeks.

P27

Fixierung von Frakturen, osteochondralen Fragmenten und Osteotomien mit bioabsorbierbaren Magnesiumschrauben

M. Moritz, O. Jungesblut, R. Stücker, M. Rupprecht

Questions Until now, no evidence-based guideline exists for hardware removal in children. Nearly 60% of the surgeons routinely remove hardware in children after bone healing but there are arguments against removal like potential for complications from the surgery, the related anesthesia or increasing medical costs.
In the literature there are some studies comparing biodegradable magnesium screws to other fixation techniques like titanium screws. In most of the cases there is no difference in respect to clinical outcome and complications.
Currently, only a small number of cases exist reporting the fixation of bone fractures or osteochondral fragment with biodegradable magnesium-based alloy compression screws.
Methods Between March and November 2018, magnesium screws (MAGNEZIX® CS 2.0, 2.7, 3.2) were used in ten patients (five girls and five boys aged 14±2 years) for fixation of fractures (five), an osteochondral fragment (one) or for osteotomies (four) of the upper and lower extremities.
Results With a follow-up of minimum six weeks (6-36 weeks) all but one patient had an excellent clinical result. No prolonged wound healing or deep infections were observed. Follow-up X-rays showed a radiolucent area around the implants in all of the cases after six weeks but without clinical or radiological signs for delayed union. One screw fracture was noticed in a case of fixation a Chevron osteotomy of a symptomatic digitus quintus varus deformity with a single compression screw 2.0. Most probably the single small screw broke because of too early full weight bearing.
Conclusion We achieved encouraging results in short-term follow-up regarding clinical outcome and complications using biodegradable magnesium screws.
In our opinion it is desirable to reduce the number of surgical treatment particularly in pediatric surgery. However, longer follow-up is needed for evaluation of this new treatment concept.

P28

Spiegelt sich der intraoperative Derotationswert bei Torsionsstörungen der Tibia in der Ganganalyse wider?

F. Unglaube, A. Kranzl, R. Ganger

Questions A derotational osteotomy of the tibia (TRO) is a common procedure to correct torsional deformities of the tibia (TTA). Several fixation techniques are applied. 3 D gait analysis (GA) is a tool to evaluate the progress of therapy[1]. Previous works have been shown effects of TRO on certain biomechanical gait parameters [2]. However, the intraoperative amount of derotation (IOD) has not been taken into account in those works. In daily clinical practice, we frequently find cases were the IOD is not reflected in the GA. Therefore the study aims to compare the IOD with the measured data pre and postoperative from the GA.

Methods We retrospectively included patients from our GA database who got a TRO and do not had any neuromuscular disease. All included patients had a GA before and after surgery. As the outcome, the difference between IOD and the pre to post difference of the transverse knee angle (dGA) in stand phase (dGAOP) was calculated. A descriptive analysis per group (inward vs. outward correction, fixation technique) was conducted. Based on an reliability study [3], dGAOP values out of a confidence interval (CI) with 0 ± 4° were classified as over or undercorrected.

Results 12 of 23 extremities with inward correction (IN) and plate fixation are classified as undercorrected and 3 as overcorrected. 8 extremities are within the CI. In the group with outward correction (OUT) and plate fixation, 6 out of 24 are classified as undercorrected, 3 as overcorrected and 15 are within the CI. (Tab. 1)

		within confidence interval (CI)	overcorrection		undercorrection	
group	**method (n/ % out of CI)**	**dGAOP +/-4°**	**dGAOP 4.1° to 9.9°**	**dGAOP > 10°**	**dGAOP -4.1° to -9.9°**	**dGAOP > -10°**
IN (n = 35)	osteosynthesis plate (n = 23/ **65.2 %**)	8 (**34.7 %**)	1 (**4.3 %**)	2 (**8.6 %**)	6 (**26.1 %**)	6 (**26.1 %**)
			3 (**13.0 %**)		12 (**52.2 %**)	
	external fixator (n = 9/ **77.7 %**)	2 (**22.2 %**)	2 (**22.2 %**)	3 (**33.3 %**)	2 (**22.2 %**)	-
			5 (**55.5 %**)		2 (**22.2 %**)	
	k - wire (n = 1)	-6.7°				
	pedi nail (n = 2)	-0.1° and -1.1°				
OUT (n = 31)	osteosynthesis plate (n = 24/ **37.5 %**)	15 (**62.5 %**)	2 (**8.3 %**)	1 (**4.2 %**)	2 (**8.3 %**)	4 (**16.7 %**)
			3 (**12.5 %**)		6 (**25 %**)	
	k - wire (n = 7/ **85.7 %**)	1 (**14.7 %**)	4 (**57.1 %**)	1 (**14.3 %**)	-	1 (**14.3 %**)
			5 (**71.4**)		1 (**14.3 %**)	

Conclusion Plate fixation shows a clear tendency to be undercorrected for internal correction (52.2 %). For external derotation, a tendency for undercorrection is seen (25 %). The other fixation techniques show over and undercorrection as well (Tab. 1). Errors regarding the marker placement were eliminated. Thus the deviations between IOD and dGA are related to errors in the goniometer based measurement of the IOD and screw fixation during the surgical procedure. Those errors have already been found in plate fixation at the femur [4]. Therefore the methods to determine the IOD and fixation of the osteotomy should be evaluated critically.

[1] Radler et al. 2010, Gait & Posture.
[2] Davids et al. 2014, Pediatr. Orthop.
[3] Svoboda et al. 2012, Gait & Posture.
[4] Geisbüsch et al. 2017, J. Orth. Res.

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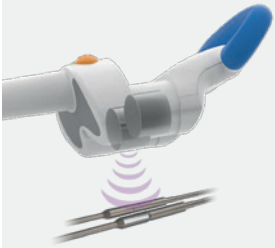

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