Surgical release of neurological hip luxation in children

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Development of hip luxation

- At birth these hips are normal developed, also in ultrasound examination.
- Secondary due to muscle imbalance hip luxation is progressive in growth:
  - It depends on the extent of neurologic disorder (among other reasons the weakness of the gluteal muscles in relation to the spastic adductors).
  - Dysplasia of the acetabulum is generated by pressure of the dislocated femoral head.
Intervention

- Open surgical reposition, with or without bony reconstruction does not effect the disturbed muscle balance
- the neurologic/muscular imbalance persists
  - High risk of recurrence
Surgical intervention

femoral
• derotational-varisation-osteotomy of the femur
• frequently with troch. minor-removal by osteotomy

pelvic
• Pemberton, Dega or Salter (<7 Lj.)
• combined with surgical release (tenotomie, fascial release)
• frequently by open reposition
MMC/Spina bifida

- restrictive indication is recommended (rarely pain)
  - risk of increased contracture and loss of function

Conditions for a good indication are:

- a good function (3/4) of the Quadrizeps muscle
- level of paralysis below L2/potential to walk
- a loadable, solid knee and foot (surg./orthosis)
AMC
Arthrogryposis multiplex congenita

- in unilateral hip luxation surgery is recommended
- in bilateral hip luxation surgery may be indicated if there is pain or in cases with less pronounced contractures
- the patients are able to walk with dislocated hips in the domestic area

restrictive surgical indication because the risk of pronounced postoperative contracture is high in most of the cases there is no improvement of function
hip-sUBLUXATION in bilateral/monolateral spastic ICP

• the higher the degree and severity of the spastic (muscle imbalance) the higher the risk for development of hip luxation
• highest incidence at the age of 7 and 14
• x-ray of the pelvis/ap is recommended every year if there is an asymmetry
conservative treatment regimen at our department

deficit of acetabular coverage (described by Reimers Index)
deficit >30% <50% (means subluxation) and asymmetry

• abduction-orthosis during night time
• abduction-wedge in the wheelchair

• eventually combined by
  • Botox-injection in walking children
  • Phenol-injection (N. obturatorius) in non walking children
surgical treatment regimen at our department

Deficit persists >30% after conservative treatment or
>50% in children <10 years with a well shaped acetabulum

• tendon release/lengthening, until „hip-symmetry“ is achieved (examination/amplifier, during intervention)
• we avoid overcorrection

>50% and >10 years or a short acetabulum.
• bony reconstruction is recommended
Tendon release in hip-subluxation

- tenotomy of adductor longus mostly on both sides
- on the less covered side: combined with tenotomy of the Gracilis prox. and the hamstrings dist. (medial popliteal fossa), mostly both side
- Gracilis rarely (in fossa), Semitendinosus, Semimembr. by fascial lengthening
- Iliopsoas only in very rare cases

progressive release up to x-ray controlled symmetry (well centered head)
rehabilitation

intraoperative long leg cast or mostly abduction-orthosis with knee and hip/flexion for 3 weeks

•>50%: orthosis for 12 weeks (lying/sitting/wheel-chair/1.day) afterwards orthosis only during night time (in flex., abd., and external rot. for the more affected hip)
•no flexion in case of walking kids
effect of adductor release for hip sub-luxation in cerebral palsy: evidence report of the AACPDM (amer. CP akademie) in 2004

- includes 27 studies from 1967 until 2000
- level of evidence mostly IV (rarely III, V)
- 241 of 467 hips with better coverage one year after intervention (Reimers Index)
- weakness: heterogeneous patients and therapy
Baise/Aschau, follow-up examination 2003 (1-7 years after the intervention)
69 luxated and subluxated hips in children with ICP

• 5.6 years at time of intervention,
at follow-up 8.8 years,
release, long leg cast or abduction-orthosis after intervention with knee and hip/flexion for 3 weeks
>50%: orthosis for 12 weeks, afterwards during night time

in 32 subluxations, at follow-up there were 4 subluxated hips in 37 luxations, 2 luxated and 8 subluxated hips at follow up
in our department, OKS St. Gallen follow-up 2010
22 surg. Release 2006/2008 10 sublux./12 lux. with ICP

• Improvement in hip coverage in 16/22 cases (increase of Reimers Index >10%)
• follow-up 3 years after surgery (2-4 y.)
• in 10 subluxations: 3 sublux. (mean 9 years at intervention)
• in 12 luxations: 8 lux., 2 sublux., only in 2 cases deficit <30% (mean 11 years)
Case report I: bilateral ICP 5 years

Medical history: 5 years, GMFCS III

- Independent sitting, alternating crawl, able to stand and walk on his knees and standing with hip-flexion and knee-flexion, bilateral flat feet

Clinical results:
- Cross leg reflex (Windschlag) and klonus pos., other reflexes vigorous,
- Pelvic obliquity upwards on the right side
- Hip-abduction flexed: right 10°, left 30° (stretched 0°/25°)
Bilateral ICP 5 years, GMFCS III

surgery: Adductor longus-, Gracilis-tenotomy on the right side
Hamstring-release (popliteal) bilat.
3 weeks casting and 9 weeks abduction orthosis (day/night)
afterwards only during night time

• covering before surgery: right 54%, left 34%
• 3 years follow-up
  (improvement of Reimers index 54 to 26%, AC-angle 28-20°)
Case report II: bilateral CP, GMFCS IV

- Medical history: 10.5 years, independent sitting, alternating crawl, able to stand and walk on the knees, standing with hip-flexion and knee-flexion, bilateral flat feet, no independent walking, she takes the entire weight during transfer, increasing cross leg (Windschlag) to the left side
Case report II: bilateral CP, GMFCS IV

• surgery: (deficit: 42%, 11 years)
  Add. Long. tenotomy bilateral
  Gracilis tenotomy prox. right side,
  med. popliteal hamstrings
  release bilat.(Semimembr., Gracilis)

• at follow-up 2 years:
  increase of deficit 42-23%, AC-angle 31-23°
Conclusion

indication for surgical intervention: children <10 years, subluxation

• strict subsequent treatment, rehabilitation
• advantages
  • percutaneous surgery, no/hardly bloodloss
  • time for surgery: 1-1.5 h including cast
  • no femoral head necrosis seen
  • mobilisation almost painless on the 1st day, sitting/wheelchair/toilet (care, comfort)
    discharge after max. 1 week (familiar environment)
  • after 3 weeks staying/walking (outpatient reha.)