

Gentofte Hospital

Handsurgery and treatment of Cerebral Palsy planning, Botulinum Toxin, surgery and postoperativ treatment



- 11.NORDISKE BANDAGIST KONGRES, KØBENHAVN 6.-8.SEPTEMBER 2018
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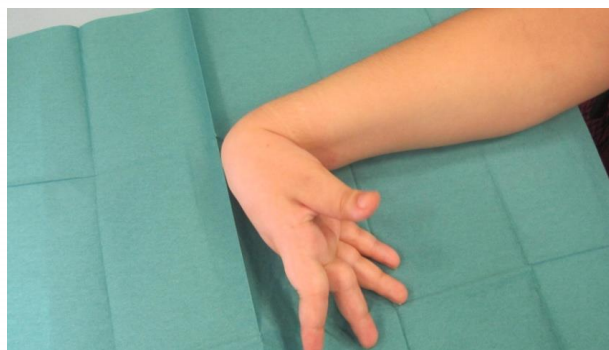
Definition

Tachdjian's Pediatric Orthopaedics, Third Edition 2002

Mutch L, Albermann E, Hagberg B; Dev Med Child Neurol; 1992;34:547

Leclercq C; BMC Proc 2015; 9(suppl 3): A70

- Cerebral palsy is the result of a brain lesion.
- The brain lesion must be fixed and non progressive
- The abnormality of the brain results in motor impairment
- CP includes all the sequelae occurring during the perinatal period



Epidemiology

Bhushan V, Paneth N, Kiely JL: Pediatrics 1993;91:1094

National Clinical Guidelines for Physiotherapy and Occupational Therapy in DK, 2013

- The incidence of CP is increasing slightly
- Between 2.0 and 2.7 per 1.000 live births
- The risk of CP in a child born full-term is 2 in 1.000.
- 50 % of children with CP have low birth weight
- The incidence is higher in males than in females
- Between 2.000-2.500 children in DK (< 17 Years)

Subtypes and operative indications

Orthopaedic Clinics of North America; Vol 41, issue 4, 2010
Orthopade 2004 Oct;33(10):1163-72

- Spastic CP – 88% (possible surgery)
- Ataxic CP – 2 %
- Athetoid CP – 10 % (Severe)
- Diplegia
- Hemiplegia and CP
- Quadriplegia and CP
- Surgical interventions are applied in less than 20%,
thats mean a limited place



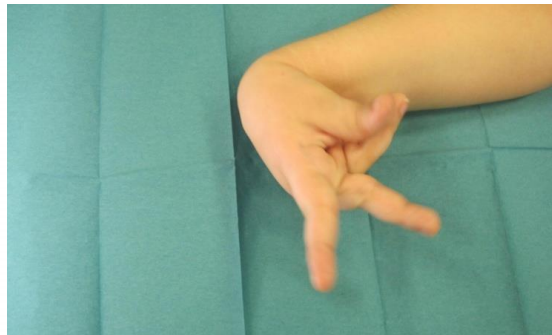
Indication and recommendations



Medical examination and strategy

- Gross Motor Function Classification Scale (GMFCS)
- 5 Groups – one to five. Group one is light and five is severe.

- 45 % Group 1
- 8 % Group 2
- 4 % Group 3
- 16 % Group 4
- 23 % Group 5



GMFCS for children aged 6-12 years: Descriptors and illustrations

	GMFCS Level I Children walk indoors and outdoors and climb stairs without limitation. Children perform gross motor skills including running and jumping, but speed, balance and coordination are impaired.
	GMFCS Level II Children walk indoors and outdoors and climb stairs holding onto a railing but experience limitations walking on uneven surfaces and inclines and walking in crowds or confined spaces and with long distances.
	GMFCS Level III Children walk indoors or outdoors on a level surface with an assistive mobility device and may climb stairs holding onto a railing. Children may use wheelchair mobility when traveling for long distances or outdoors on uneven terrain.
	GMFCS Level IV Children use methods of mobility that usually require adult assistance. They may continue to walk for short distances with physical assistance at home but rely more on wheeled mobility (pushed by an adult or operate a powered chair) outdoors, at school and in the community.
	GMFCS Level V Physical impairment restricts voluntary control of movement and the ability to maintain antigravity head and trunk postures. All areas of motor function are limited. Children have no means of independent mobility and are transported by an adult.

Illustrations copyright © Helen Granger, BSc, PhD and Adrienne Harvey, The Royal Children's Hospital, Melbourne. BMC 197208

- 75 % has epilepsia and 40 % has an IQ > 70

Strategy

S. Sonne-Holm and H. Rasmussen ;Cerebral Palsy - Treatment and regime; KHH: 2009

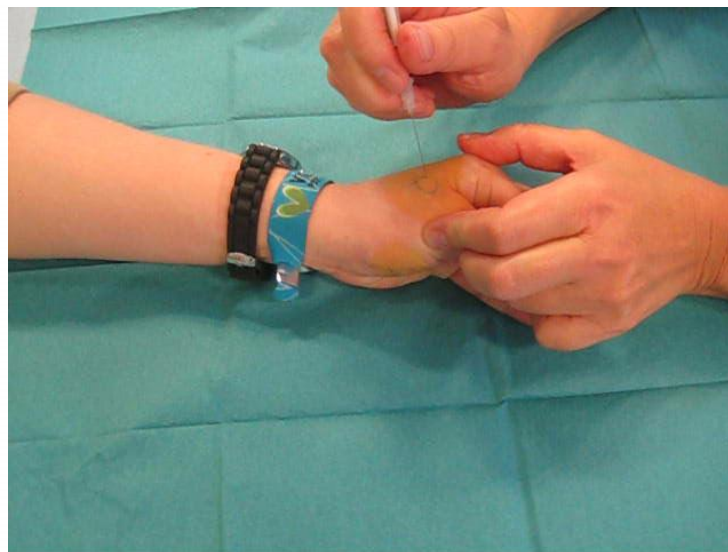
S. Michelsen, E. Flachs, P. Due and P. Uldall; Children with CP in Dk; Syddansk Universitet: 2010

Team function

- Goals of surgical treatment must be clearly defined and accepted preoperatively
- Goals can be: Position change, improve appearance, facilitate hygiene and cosmetics
- All goals are clear indications and must be discussed with the patients and the family

Preoperative strategy

- Evaluation
- Occupational therapy (Mirror treatment)
- Botulinum toxin
- Evaluation



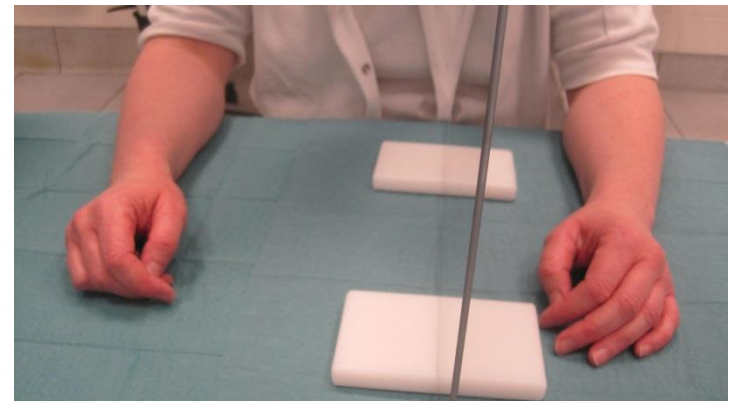
Botulinum toxin in children (technique)



Mirror therapy

J.Phys.Ther.Sci 28:3227-3231, 2016 (Review Article)

- Mirror-mediated therapeutic intervention targeting CP was confirmed.



The Classical arm position

Flexion of the elbow, pronation of the lower arm, flexion of the wrist and fingers and thumb in palm

Cerebral palsy. Freeman Miller. Springer 2004

- Greens transfer – balance the wrist (FCU to ECRL)
- M.pronator to supinator re-routing (supination)
- Proximal carpectomy and arthrodesis of the wrist
- M.extensor pollicis longus to m.abductor pollicis
- M.brachioradialis or m. palmaris longus to m.abductor pollicis – activating
- M. adductor pollicis gliding procedure

Surgery aims

Caroline Leclercq . Cerebral palsy: a comprehensive review
BMC Proc. 2015;9 (suppl 3): A70

- Reducing spasticity
- Relieving muscle/joint contracture
- Augmenting paralysed muscles, whenever possible by tendon transfer
- Surgery seems more effective if performed earlier in the patient's life
- Improve use of an extremity can improve cortical representation of the extremity and maybe decrease the development of neglect



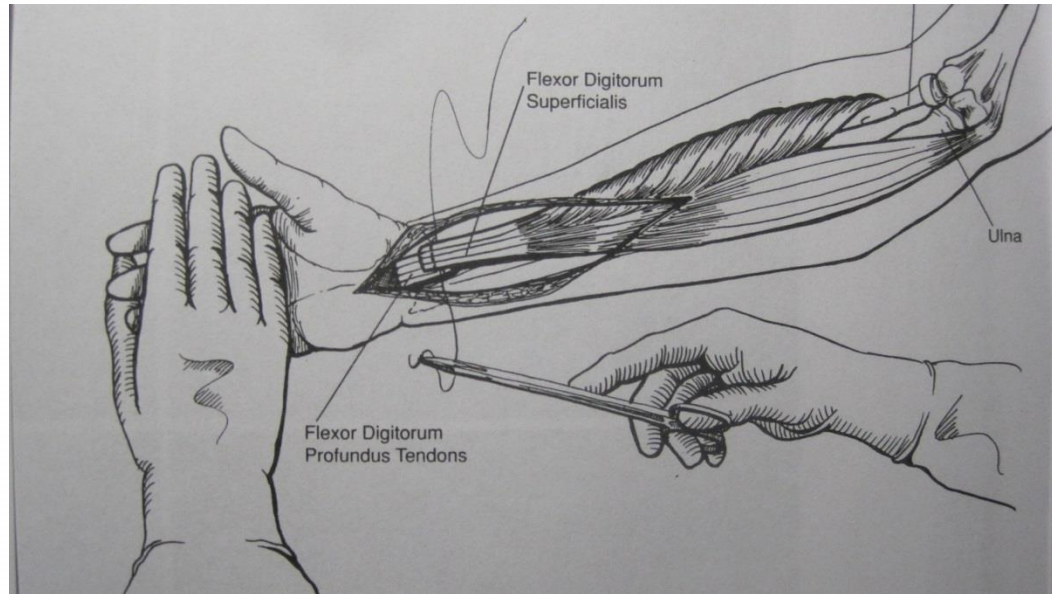
Surgical treatment of the upper limb

- Restore balance
- Soft tissue release
- Tendon transfer
- Arthrodesis
- Neurectomy



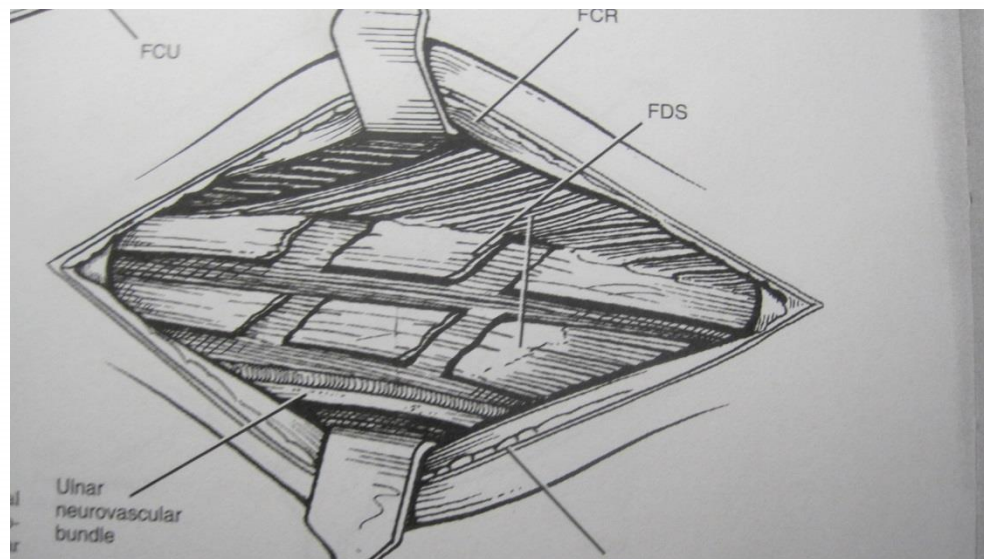
Superficialis to profundus (STP) procedure

Keenan MA et al. Manual of Orthopaedic Surgery for Spasticity. New York 1995



Fractional lengthening of the digital flexors

- Two oblique incisions in the tendinous portion



Postoperativ treatment

- BTX to the transposed muscles
- Plaster of Paris 5-8 weeks
- Occupational therapy and mirror treatment

Thank You for your attension

