Non-Surgical Treatment of Non-Idiopathic Scoliosis

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SOSORT 2014 Educational Course
Background

There is a clear trend towards early surgery, but this can be associated with some problems:

- loss of fixation due to bone-anchoring failure
- implant failure
- wound dehiscence and infection
- neurologic injury
- chest wall and spinal rigidity due to scar tissue
- development of junctional deformities at the ends of instrumented segments

The conservative treatment of non-idiopathic scoliosis thus still is a valuable therapeutic procedure, especially as a delaying tactic.
To keep in mind:

- Patients with a non-idiopathic scoliosis are suffering from a (mostly) severe basic disease.
- Beside the scoliosis, the patients are suffering from symptoms resulting from or associated with the disease (e.g., pathologic muscle tonus, paralysis, mental retardation, hip deformity...).
- Defining a standardized treatment is impossible.
Possibilities of conservative therapy

- Bracing
- Casting
- Halo - Gravity Traction
- Physiotherapy
Bracing

- The aim of bracing depends on the basic disease, the extent of the curves, and other clinical symptoms:
  - correction of the curves
  - stabilization of the curves
  - obtaining sitting ability
- There are different types of braces and rules for wearing them.
### Bracing

#### Our experience with bracing:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Bracing Type</th>
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<tbody>
<tr>
<td>Cerebral Palsy</td>
<td>hypertonic - hypotonic +</td>
</tr>
<tr>
<td>Duchenne’s Muscular Dystrophy and Spinal Muscular Atrophy</td>
<td>-</td>
</tr>
<tr>
<td>Tethered Cord Syndrome (not active / after release)</td>
<td>+</td>
</tr>
<tr>
<td>Spina Bifida (without active tethered cord)</td>
<td>+</td>
</tr>
<tr>
<td>Marfan Syndrome</td>
<td>+</td>
</tr>
<tr>
<td>Neurofibromatosis</td>
<td>-</td>
</tr>
<tr>
<td>Mucopolysaccharidosis</td>
<td>+</td>
</tr>
<tr>
<td>Osteogenesis Imperfecta</td>
<td>+ (Limitation: bone quality!)</td>
</tr>
<tr>
<td>Skeleton Dystrophy</td>
<td>- / +</td>
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</tbody>
</table>
Bracing

- Possible problems associated with bracing:
  - aggravation of the curvatures despite bracing
  - loss of function (motion, respiration)
  - loss of independent activity and participation
  - brace-induced rib deformity
  - damaged skin
  - lack of acceptance
Seating adjustments and wheelchair modifications

- If bracing fails, seating adjustments and wheelchair modifications may be an alternative

http://www.ottobock.com

http://pro.ortholutions.de
Casting

- cast is applied under traction
- patient is under anesthesia
- cast change every 2 – 4 months
- series of 3 – 5
- afterwards switch to brace
- aggravation? return to cast for a period of 4 months

Johnston II, 2011
Casting

- Metha, 2005:
  - early beginning of treatment (age 19 months, average curve 32°)
  - reduction to < 10° at maturity
- later beginning of treatment (mean age 30 months, average 52°)
  - no progression (46°)
Halo-Gravity Traction

- minimum of 6 pins
- initial traction with 5 – 10 lb
- step by step increasing of traction to 50 % of body weight
- 2 – 6 weeks
- careful neurologic monitoring (cranial nerve testing, upper and lower extremity strength and reflex testing)
- patients may carry out dynamic body action
- patient auto-relieve is possible

Johnston II, 2011
Halo-Gravity Traction

- effective improvement in trunk shift and coronal deformity, preparing for casting or surgery (mobilization, neurological status) (Rinella et al. 2005, Sink et al. 2001, Walick et al. 2008)
- benefit for respiratory mechanics
- Kuklo et al, 2008:
  9/62 complications (nystagmus, sensory changes, one cranial nerve lesion)
Physiotherapy

<table>
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<tr>
<th>Aims</th>
<th>Methods</th>
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<tbody>
<tr>
<td>▪ mobility of the spine ↑</td>
<td>→ open the concavity (movements, positioning)</td>
</tr>
<tr>
<td>▪ „know the midposition“</td>
<td>→ training of the proprioception</td>
</tr>
<tr>
<td>▪ daily life activities ↑</td>
<td>→ functional training</td>
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<td>▪ ventilation of compressed lung segments</td>
<td>→ chest physiotherapy</td>
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<tr>
<td>▪ physical capacity↑</td>
<td>→ physical activity ↑</td>
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</table>
Treatment of Non-Idiopathic Scoliosis

- no standards
- specialized center with conservative and operative options
- experienced team (MD, surgeon, physiotherapist, occupational therapist, technician)
- longtime accompaniment
- step by step individual decision making, depending on the basic disease, current clinical symptoms (due to the scoliosis and the basic disease), age, personality and acceptance by the patient