The Effects of Core Strengthening on the Gait Pattern of an Obese Middle School Child

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Abstract
This case report details the use of a core strengthening program on an obese middle school child with impaired gait mechanics. Research has established that obese children ambulate with a slower walking velocity, longer double leg stance, wider stance width, and a greater degree of asymmetry. The child was referred to physical therapy with an acute low back sprain, treatment was focused on improving the low back sprain and gait abnormality via a core strengthening program. This case provides an example of how providing a core strengthening program to an obese child in middle school can help improve the impaired gait mechanics found in obese children.

Background
• Obesity is currently the most common disease in adolescence
• 16.9% of adolescents are considered obese
• Children who are obese are less likely than normal weight children to participate in physical activities
• Children who are obese require a higher energy cost, as compared to normal weight and overweight children
• The most fundamental and challenging motor skill that a child develops is ambulation
• Ambulation is an important skill to master because it is the prerequisite to all of the motor skills required for physical activity.
• It is believed that if physical therapists make physical activity enjoyable to children who are obese, the children will be more inclined continuing their participation in physical activities

Purpose
The purpose of this case study is to observe the effects of a core strengthening program on the gait pattern of an obese thirteen year old female.

Case Patient Description
• 13-year-old obese female with a BMI of 30.7
• The patient sustained a low back sprain while assisting her family move.
• The patient referred to physical therapy to strengthen her core stabilizers to decrease her current low back pain and to prevent a reoccurrence of low back pain.
• Patient presented with decreased core and hip girdle stabilization strength, decreased muscle length, decreased balance, impaired gait, impaired posture, and increased pain.
• Pt required physical therapy 2x/wk for 8 weeks to return patient to prior level of function.

Exercises Performed by the Case Patient

<table>
<thead>
<tr>
<th>Balance</th>
<th>Strengthening</th>
<th>Core Stabilization</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image1.png" alt="Image" /></td>
<td><img src="Image2.png" alt="Image" /></td>
<td><img src="Image3.png" alt="Image" /></td>
</tr>
</tbody>
</table>

This table demonstrates a few of the exercises performed by the case patient during her core strengthening program.

Results

<table>
<thead>
<tr>
<th>Tests</th>
<th>Evaluation</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Leg Stance</td>
<td>R= 5 secs, L= 4 secs. B trendelenburg and instability.</td>
<td>R= 5 secs, L= 34 secs with minimal sway.</td>
</tr>
<tr>
<td>Gait</td>
<td>Symptomatic, increased BOS, Lateral shifting, B hip hike, increased stride length, B hip flex.</td>
<td>Increased BOS, ER hips B, increased cadence, decreased heel strike and push off.</td>
</tr>
<tr>
<td>Posture</td>
<td>Low-ward flexed trunk, hips in slight ER, increased lumbar lordosis, B pas plantas.</td>
<td>Hips in slight ER, increased lumbar lordosis, B pas plantas</td>
</tr>
<tr>
<td>Flexibility</td>
<td>(Hamstrings at 90 deg of hip flex)</td>
<td>R: 76 deg, L: 80 deg</td>
</tr>
</tbody>
</table>

* Plank assessed on 3 visits. Plank was not evaluated on 3rd visit due to anxiety of pain

Conclusion
• During the eight week core strengthening program the case patient demonstrated significant improvement in:
  • Single leg stance time
  • Core strength
  • Bilateral lower extremity strength
  • Gait parameters
  • Hamstring and gastroc flexibility.
• After the core strengthening program patient gait pattern demonstrated: increased stability of the trunk, increased stride length, and increased cadence.
• The patient demonstrated these improvements despite her weight remaining unchanged.
• This case study suggests that a core strengthening program should be performed when a goal for therapy includes improve the gait mechanics of an obese child.
• In the future, the body composition and the child’s self-efficacy in physical activity should be measured.

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References

- Deforche, B., Dufek, J. S., Currie, R. L., Epstein, L. H. (2011). Effects of overweight and obesity on walking characteri...