Determining the Most Effective Brace Among Adolescents with Idiopathic Scoliosis: A Meta-Analysis

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INTRODUCTION:
Adolescent idiopathic scoliosis (AIS) is a nonfatal disease of the spine that exhibits a 10 degree or greater lateral curvature of the spine. It develops in 3% of children between the ages of 10 and 16 years, with a preference for females. Brace treatment has been championed as a minimally invasive procedure, in comparison to surgery, for AIS patients. Following the Brace Evaluation of Adolescent Idiopathic Scoliosis Trial (BrAIST), a strong evidence-based support for brace treatment was obtained. Currently, a number of bracing options are available for AIS patients.

METHODS:

Guidelines for the treatment of scoliosis in adolescents:

<table>
<thead>
<tr>
<th>Cobb angle:</th>
<th>Treatment Option:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20:</td>
<td>Observation</td>
</tr>
<tr>
<td>20-45:</td>
<td>Orthotic Treatment</td>
</tr>
<tr>
<td>45+:</td>
<td>Surgical Correction</td>
</tr>
</tbody>
</table>

Data Extraction and Analysis: All studies were analyzed by two independent authors (Ausha Syed and Natalie Blakeley) and data from the studies were extracted to a Microsoft Excel spreadsheet (see Figure 6 for shortened data extraction tool). Data included name of first author, year of publication, type of study, type of brace tested, sample size for brace treatment groups, initial and final Cobb angles out-of-brace, patient age, patient sex, brace treatment duration, curvature location, compliance, and success rates. Success was defined as correction (Cobb angle reduced by >5°) or stabilization (Cobb angle change of ≤5°). Failure was defined as progression (Cobb angle deterioration of >5°) or referral for surgical correction. Although different pieces of data may not have been reported in studies, if the type of brace and Cobb angle measurements were reported, the study was included in this meta-analysis.

Quality Assessment: A modified Downs and Black assessment was used to evaluate quality of each study. Questions 13, 14, 15, 17, 23, and 24 of the original assessment tool were omitted as they did not apply to the studies included and question 27 about power analysis was simplified, meaning a score was determined out of a total of 21 points instead of the original 28.

RESULTS:

From this meta-analysis on AIS bracing treatment options, the most effective brace was determined to be the Lyon brace. The hierarchy outlined provides clinicians with a quantitative evidence-based reference for brace treatment of AIS patients. The meta-analysis also highlights optimal brace design for future brace engineering.

CONCLUSIONS:

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REFERENCES:

