INTRODUCTION
Best practice guidelines regarding the biomechanical principles employed during orthotic treatment of adolescent idiopathic scoliosis (AIS) are not clearly defined. Ongoing efforts to clarify and define biomechanical principles of adolescent idiopathic scoliosis have begun to lay the groundwork for what could eventually become best practice guidelines. In 2002 the American Academy of Orthotics and Prosthetics convened a State of the Science Conference, which outlined basic understandings as well as identified shortcomings in current research regarding orthotic interventions. While this served a great need and remains a gold standard, several years have passed and many advances have been made in the treatment of AIS. The SOSORT group has been a leader in the international community of the conservative treatment of scoliosis, and has published several articles in the SOSORT journal that convey “expert” agreement in areas that cannot be defined by research yet. Creating a consensus statement on orthotic treatment of AIS is necessary for better treatment for AIS. By definition, consensus statements are an agreed upon current best practice based on scientific outcomes based evidence. Medicine in general does not always have the necessary scientific evidence to confirm a consensus, and when such a situation arises, a poll of so-called “experts” that agree on a statement may be used until a true consensus may be reached. The objective of this study is to use a survey tool that polls expert opinions of experienced spinal orthotists to determine where areas of agreement or disagreement arise regarding the biomechanical correction theory used for orthotic treatment for AIS. When areas of disagreement are identified, literatures are reviewed to identify existing evidences and advance understanding on these areas.

METHOD
Apparatus: Online-based survey method and literature review method.

Survey Procedures: Twenty-one questions (including three questions for defining qualification for data) with multiple-choice style were developed for this study focused on general concepts and typical case examples (PA and lateral view x-rays were provided for case examples) to target orthotic biomechanical concepts including some of the more controversial topics within the spinal orthotic community. The subjects were invited to participate by sending a link for the online survey to the Spinal Orthotic Society (SOS) members of the American Academy of Orthotists and Prosthetists (AAOP) through a mass emailing system, and spinal orthotists in the spinal orthotic field who are not in the SOS via each individual email address and by posting the link on other O & P community websites.

Participant inclusion: Certified orthotist / certified orthotist and prosthetist, with scoliosis orthotic treatment experience of at least 2 years.

Literature Review Procedures: A review of the literature was conducted on each of the areas identified as a topic of disagreement from the survey. The following criteria was used to select studies: Studies related to AIS are included; Studies related to aetiology, operative treatment, or physical therapy are excluded; Studies looking at a specific orthotic system are excluded; Studies designed using a non-descriptive method are included; All literature reviews and education materials, including books, are included. However, oral presentations are excluded; Studies published before the year 1960 are excluded; Studies designed for any correction in-orthosis by radiography are included.

Data Analysis: The data was analyzed by measuring the answers of multiple choices for each survey question. During the analysis of literature, the level of evidence was marked for each article.

RESULTS
Fifty people surveyed and 46 people qualified for inclusion. 3 people were not certified orthotists and one had less than 2 years experience in orthotic treatment of scoliosis and were excluded.

Participants agreed with ten topics. Eight topics were defined for which participants failed to find a clear agreement (less than 50% of participants): Biomechanical correction goal of AIS treatment; The level of a thoracic pad for right thoracic curve case; The placement(s) of a primary corrective force(s) in the sagittal plane to address the thoracic hypo-kyphosis case; The necessity of abdominal compression for non-lumbar hyper-lordosis case; The necessity of reducing lumbar lordosis for non-lumbar hyper-lordosis case; Orthotic recommendation for a single primary curve case (more than 35 degree Cobb angle), where the apex is located at or below T12/L1; Orthotic recommendation for an upper thoracic curve (with an apex T2-T6) / cervico-thoracic curve (with an apex C7-T1) case; the treatment necessity for pelvic obliquity case, secondary to scoliosis.

DISCUSSION and CONCLUSION
Experts agreed with 10 biomechanical orthotic correction topics and found some evidences for 8 topics, which participants failed to find an agreement. However, more quantitative investigations are still needed to understand biomechanical correction concepts while treating AIS with an orthosis.

CLINICAL APPLICATIONS
A long-term goal associated with this project is to contribute toward the ongoing efforts to work toward reaching a consensus for better orthotic treatment of AIS.

REFERENCES