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Influence of Cobb’s Angle on the Sagittal Alignment in Adolescent Idiopathic Scoliosis

Batra Sahil, Garg Bhavuk, Mehta Nishank

Presenting & Corresponding author- Sahil Batra , Senior Resident, All India Institute of Medical Sciences, New Delhi

BACKGROUND DATA
Scoliosis is a three-dimensional deformity. While the coronal deformity has traditionally been focussed upon; the importance of sagittal component of the deformity has been recently elaborated and has been shown to be associated with long-term health-related quality of life outcomes. However, the influence and relationship between different planes of the deformity is still unclear.

AIMS AND OBJECTIVES
To determine whether coronal parameters influenced the sagittal profile in AIS patients

MATERIALS AND METHODS
Pre-operative radiographs of a retrospective cohort of 115 patients with AIS who underwent surgery (posterior-only deformity correction) were reviewed and coronal and sagittal parameters were measured. These included: Lenke’s curve type, lumbar modifier, Cobb’s angle, Pelvic incidence (PI), Pelvic Tilt (PT), Sacral Slope (SS), lumbar lordosis (LL), thoracic kyphosis (TK), pelvic incidence minus lumbar lordosis (PI-LL), pelvic sagittal state and sagittal vertical axis (SVA). Patients were divided into different groups based on their Lenke’s curve type (Type 1-6), lumbar modifiers (Type A-C) and Cobb’s angle and the sagittal parameters between various groups were compared and analysed.

RESULTS
Based on the Lenke’s curve type, our patients were divided as follows: Type 1 = 60, Type 2 = 8, Type 3 = 8, Type 4 = 2, Type 5 = 30, Type 6 = 7. Except for TK, none of the other sagittal parameters correlated with the Lenke curve types. Likewise, TK was the only sagittal parameter that differed between groups categorized on the basis of lumbar modifier and the Main Thoracic (MT) Cobb’s angle. The Thoracolumbar/Lumbar (TL/L) Cobb’s angle made no difference on any of the measured sagittal parameters.

CONCLUSION
The influence of the coronal component of the deformity on the pre-operative sagittal profile was limited. Sagittal alignment of the patient is an independent component of the deformity in itself and has to be separately evaluated and addressed.
Title
Effect of Sequential Multi-axial Corrective Surgery on Sagittal Balance in Adolescent Idiopathic Scoliosis

Batra Sahil, Garg Bhavuk, Mehta Nishank

Presenting & Corresponding author- Sahil Batra , Senior Resident,All India Institute of Medical Sciences,New Delhi

BACKGROUND DATA
Sagittal spinal and sacropelvic alignment is a crucial factor in deciding long-term patient outcomes. Not much is known about effects of deformity corrective surgery on the sagittal profile in Adolescent Idiopathic Scoliosis (AIS).

AIMS AND OBJECTIVES
To analyse changes in pre-operative and post-operative spinopelvic and global sagittal parameters in AIS patients undergoing single-stage, posterior-only surgery using sequential multi-axial correction

MATERIALS AND METHODS
Coronal and sagittal balance parameters were measured in pre-operative and post-operative radiographs of a retrospective cohort of 91 AIS patients. Patients underwent single-stage, posterior-only deformity correction with a hybrid pedicle screw-hook construct using sequential multi-axial correction. Following parameters were collected: Cobb’s angle, Pelvic incidence(PI), Pelvic Tilt(PT), Sacral Slope(SS), Lumbar lordosis (LL), Thoracic kyphosis (TK), PI-LL, pelvic sagittal state and sagittal vertical axis (SVA). Differences in pre-operative, immediate post-operative and 1 year post-operative measurements were analyzed.

RESULTS
In 91 patients (mean age = 15.08 ± 2.19), the mean Cobb’s angle of primary structural curve changed from 68.52° to 28.79º with surgery (p<0.00001) reflecting a 58% correction rate. While PI did not change significantly with surgery, PT (9.6 → 11.2) and SS (34.3 → 32.3) showed a statistically significant increase and decrease respectively. Compared to age-matched normative data, the AIS group was hypokyphotic and hypolordotic. The AIS patients were in negative global sagittal balance pre-operatively with a mean SVA = -12.644mm – and became even more so post-operatively with a mean SVA = -14.124cm. However, this difference was not statistically significant.

CONCLUSION
In addition to coronal alignment and derotation, sagittal alignment correction should also be considered during fusion for AIS patients. Many have an anteverted pelvis pre-operatively which becomes less anteverted with surgery (↑PT, ↓SS). Posterior-only correction does not significantly alter the global sagittal balance (SVA) in AIS patients.
ULTRASTRUCTURAL AND HISTOLOGICAL CHANGES IN TIBIAL REMNANT OF RUPTURED ANTERIOR CRUCIATE LIGAMENT STUMPS: A TRANSMISSION ELECTRON MICROSCOPY AND IMMUNOCHEMISTRY BASED OBSERVATIONAL STUDY

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ABSTRACT:

INTRODUCTION: Anterior cruciate ligament (ACL) rupture is a common injury and has a non-union rate of 40–100%. Important cellular events, such as fibroblast proliferation, angiogenesis and change in collagen fibril thickness in the ACL remnant, as described in other dense connective tissue, might have an implication in graft recovery following ACL reconstruction. Thus we conducted a study with an aim to characterise the ultrastructural and histological features of ruptured ACL tibial stump and correlate the same with the duration of injury.

MATERIAL AND METHODS: Sixty ruptured human ACLs were evaluated for collagen fibril thickness, blood vessel density (per mm²), and fibroblast density (per mm²) with the help
of transmission electron microscopy, immunohistochemistry via CD 34 antibody staining and light microscopy (H & E staining). The findings were correlated with duration of injury.

RESULTS: 54 males and 6 females patients with a mean duration of the injury of 23.01 weeks (SD = 26.09; range: 2–108 weeks) were included for the study and were divided on the basis of duration of injury as follows: Group I (<6 weeks; N=16), Group II (12-20 weeks; N=18), Group III (12-20 weeks; N=7), Group IV (20-50 weeks; N=12), Group V (>50 weeks; N=7). A significant correlation was seen with blood vessel density (r=0.303, p=0.01) and fibroblast density (r=-0.503, p=0.001). Thickness of collagen fibril did not correlate with the duration of injury (r=0.15, p=0.23). The thickness of the collagen reached its peak after 50 weeks following injury, whereas highest density of blood vessel and fibroblast was seen at 12-20 weeks. Matched pair analysis revealed a significant decrease in collagen fibril thickness and an increase in fibroblast density at 7-12 weeks.

CONCLUSION: Following injury to ACL, the ruptured tibial stump undergoes a series of changes at the cellular level vis-à-vis changes in collagen fibril thickness, vascular density and fibroblast density that possibly suggest an intrinsic healing response. This further may have implications on the functional outcome following ACL reconstruction with remnant preservation.

KEYWORDS: Human anterior cruciate ligament; collagen fibril thickness; transmission electron microscopy; blood vessel density; CD 34 antibody staining; fibroblast density
Introduction
The three-dimensional nature of spinal deformity in scoliosis is known to affect gait pattern. AIS and congenital scoliosis differ in the onset of deformity with respect to walking age as well as the etiopathogenesis. Existing literature has examined how gait patterns in Adolescent Idiopathic Scoliosis (AIS) patients differ from healthy volunteers. But how the gait parameters differ in these two groups of scoliosis patients is not reported in literature.

Aims and Objectives
To study the changes in spatio-temporal, kinematic, kinetic and electromyographic (EMG) gait variables in Adolescent Idiopathic Scoliosis (AIS) and Congenital Scoliosis patients and to compare the changes in gait patterns in AIS and congenital Scoliosis patients

Materials and Methods
Twenty scoliosis patients – 10 each with AIS and congenital scoliosis were recruited. Patients with kyphoscoliosis, limb length discrepancy and syndromic/neuromuscular scoliosis were excluded. Patients underwent comprehensive gait analysis at our 3D Gait lab equipped with fully trained personnel and specially provided gait analysis software. Reflective markers were applied as per the Helen Heyes protocol. Standard spatiotemporal, kinematic, kinetic and EMG gait parameters were assessed. Both groups were compared using t test.

Results
No significant difference was found between the two groups with respect to the radiological parameters. Spatiotemporal parameters (stride length, stride time, step length, gait speed and
cadence), kinetic measurements (Vertical ground reaction force, Force profile score index), kinematic measurements (3D shoulder, pelvis, and lower limb motions) and EMG variables (Peak EMG activation for selected muscle groups) did not differ significantly between AIS and congenital scoliosis patients. However, the GDI (Gait Deviation Index) showed that gait variables differed in both study groups as compared to normal population.

Conclusion
Gait parameters are not significantly different between AIS and congenital scoliosis, but are different in scoliosis patients as compared to normal, healthy people. The alteration in gait is secondary to the existence of the deformity and does not correlate with the onset or etiology of deformity.
Can Mesh be a useful tool in oncological reconstructions?

Dr. Muthukumaran, Dr. Venkatesan S Kumar, Prof. Shah Alam Khan
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Introduction
Mesh (prolene and vicryl) reconstruction is the treatment of choice for certain general surgical conditions. However, their use in oncological reconstructions is yet to be standardized.

Aims/ Objectives: Our aim was to study the outcome & complications of mesh reconstruction in musculoskeletal oncological procedures.

Methods: We conducted a retrospective study of patients who had reconstructive procedures using mesh (either prolene or vicryl) between 2013 and 2018 at our institute. Hospital records were reviewed to collect demographic and clinical data. Operative notes were reviewed to identify the indication of mesh in the procedure.

Results: There were a total of 92 patients with a mean age of 26.5 years. The male: female ratio was 1.66. The most common diagnosis was Osteosarcoma (39 patients) followed by GCT (22 patients) and chondrosarcoma (8 patients). Most reconstructions involved the Proximal Tibia (38%) where the patellar tendon was attached to endoprosthesis using prolene mesh. Other common sites were Pelvis, Proximal Femur and proximal Humerus. There were no cases of mesh failure leading to functional deficit. Five patients (5.5%) had deep infection and had to undergo mesh removal.

Conclusion: Mesh reconstruction is a safe and effective tool for reconstructing soft tissue defects in oncological reconstructions.
Bone-preserving Short-stem total hip arthroplasty in avascular necrosis of the hip – comparison of 5 year functional outcome

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Abstract –
Introduction –
Short-stem hip arthroplasty has the potential advantage of femoral bone stock preservation, especially in view of the expected revisions in the often relatively young patients. Despite short-stem hip prosthesis are increasingly used for total hip arthroplasty, there are no sufficient mid- and long-term results especially for patients with avascular femoral head osteonecrosis. The present study compares mid-term functional results following implantation of a short-stem prosthesis in avascular necrosis of femoral head based on etiology.

**Aims and objectives** –

Aim of the study is to compare functional outcome between 2 group of patients undergoing Short Stem Total Hip Arthroplasty

Group 1 – idiopathic and post traumatic avascular necrosis

Group 2 – avascular necrosis secondary to metabolic cause i.e. Alcohol intake, chronic liver disease, steroid induced

**Material and methods**

This is a retrospective study done at a single tertiary level care centre from January 2012 to December 2013. All cases were done by a senior arthroplasty surgeon over a period of 2 year. All patients with avascular necrosis of femoral head underwent short stem total hip arthroplasty (Metha plasma™;Braun Aesculap). Total of 27 patients underwent short stem total hip arthroplasty (20 male and 7 female), which were divided into 2 groups. Group 1 included patients with idiopathic and posttraumatic avascular necrosis of femoral head and group 2 included metabolic causes like steroid induced, alcohol induced and due to chronic liver disease. Patient’s data was obtained from service arthroplasty register and their details were retrieved from institute medical record. Surgical details including type of implant were obtained from operative notes. All patients were called for evaluation in outpatient department telephonically. The follow up period was 5 to 6 years.

We report the first cohort study comparing mid-term functional outcome in short stem total hip arthroplasty patients for idiopathic and metabolic avascular necrosis of femoral head.

**Inclusion criteria** –

Patients who underwent primary short stem total hip arthroplasty for avascular necrosis of femoral head:

1) Idiopathic or post traumatic – Group 1
2) Steroid induced, alcohol induced or chronic liver disease – Group 2

**Exclusion criteria** –

Patients who underwent

1) Revision hip arthroplasty
2) Complex primary total hip arthroplasty with bone loss
Follow up is done with functional Harris Hip scoring and radiographs of pelvis on final follow up. Radiologic evaluation was done with X-rays of pelvis with both hips and same were compared with patient’s X-rays in record that were done previously in regular follow up which was a part of standard protocol.

Ethical committee approval was taken. Written and informed consent taken from all patients. No conflict of interest to be disclosed.

Results –

No patients were lost to follow up. Mean age was 39.11 years (21 to 54 years), comparable in both groups, 39.05 years in Group 1 and 39.29 years in Group 2. Mean follow up 5.82 years (minimum 5 years to maximum 6 years). Mean Preoperative HHS was 58.22. Mean increase in HHS in group 1 was 37.70 (from 58.40 preoperative to 96.10 at final follow up). Mean increase in HHS in group 2 was 37.71 (from 57.71 preoperative to 95.43 at final follow up). Both groups showed excellent outcomes at final follow up.

Complications in form of intra operative neck split which required encirclage was seen in 3 cases of group 2 which is statistically significant. Patients which required encirclage were delayed in weight bearing. However, functional outcomes were similar to those without any complications but these cases required close monitoring.

At mean follow up of 5.82 years, there were no revisions and impending revisions. There was no implant migration. No major complications were seen and patient satisfaction with the procedure was high. There were no infections.

The patients were satisfied with the clinical outcome, particularly with regard to pain relief and early weight bearing.

Conclusion –

Use of short stem in total hip arthroplasty is a good option for avascular necrosis of femoral head in view that it will offer a good host femoral bone preservation for the revision surgeries if needed. Mid-term results of this study showed excellent clinical and functional outcome in both groups. Although cases with metabolic causes of avascular necrosis of femoral head (steroid induced, alcohol induced, chronic liver disease) require close monitoring to prevent failures.

Key words –

Short stem Hip arthroplasty, avascular necrosis

Consent – taken

Conflict of interest – nil

Source of support – none