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Posters





Treatment of articular cartilage lesion of the knee: Biopolymer hydrogel and microfracture versus microfracture only technique

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Introduction & Aim: Articular cartilage injuries of the knee are a common finding in patients with knee pain. In recent years, thermogelling biopolymer systems have elicited interest for biomedical applications, such as filler matrix for treatment of osteoarthritis and post-traumatic cartilage lesion. The purpose of this study was to evaluate and compare outcomes in two groups of patients, one treated with Microfractures (MF) and one treated with microfracture and a thermo-sensitive bio-adhesive hydrogel made of polyglucosamine/glucosamine carbonate (JR).

Methods: Sixty-nine (69) patients with symptomatic articular cartilage lesions in the knee, grade III-IV (outerbridge), treated from January 2015 to April 2015 were prospectively divided into two groups. All patients were treated with standard knee arthroscopy procedure, also associated with other treatment such as meniscal repair. The 46 patients included in JR group were treated with microfractures, plus a thermo-sensitive bio-adhesive hydrogel made of polyglucosamine/glucosamine carbonate that was applied directly on the site after marrow stimulation. In MF group, 23 patients were treated with arthroscopic microfractures as traditionally described by Steadman. All patients were allowed to full weight bearing 3 hours after surgery. The patients were evaluated clinically using WOMAC scores preoperatively, at 6 month, 1 year and 2 years follow up and VAS scores, preoperatively at 48 hours, 1 month and 6 months, 1 year and 2 years follow up. MRI and T2 mapping were performed before surgery and after 6 months to control the quality of the regenerated cartilage.

Results: The demographics and comorbid conditions known to affect outcome of cartilage repair techniques were similar between the two groups. No adverse event or complications related to surgery were observed or reported by patients. At 48 hours from surgery VAS score decreased of 41% (JR group) and of 32% (MF group), at 1 month, the decrease were 72% (JR) and 53% (MF), at 6 months there was no pain in the JR group and a decrease of 89% in the MF group, no pain was registered in both group afterwards. Before surgery WOMAC score was 56.5 in the JR group and 58.9 in the MR group, at 6 months follow up was 7.4 in JR and 28.4 in MR and at the last follow up 4.4 in JR group and 41.9 in MR group. Results from T2 mapping in JR group were compared with results from native cartilage. Biopsy was performed in 2 patients of the JR group who needed new surgical procedure due to trauma; both biopsies contained hyaline-like cartilage.

Conclusion: Patients treated with biopolymer hydrogel and microfracture technique obtained better clinical results than patients treated with only microfracture. This new technique resulted to be safe and allowed significant improvements in function and pain.

Biography

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Deformity correction of foot and ankle after TKR: Case report

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Introduction: Total Knee Arthroplasty (TKA) has proved to be a highly successful procedure for the relief of debilitating pain associated with degenerative joint disease. The 10 to 15-year survivorship of primary TKA now routinely exceeds 90%. However, despite advancements in surgical technique, implant design and postoperative management, complications continue to be a relatively common. Like infection, tendon rupture, instability which is common complication after TKR, the instability of hind foot alignment has also been reported. We reported about a satisfied case; ankle, foot deformity correction for malrotation after TKA which didn't performed about correction of knee.

Case Report: 68-year patient has visited and showed hind foot malalignment and claw toe deformity after total knee arthroplasty one year ago. Patient was suffered by pain and feel like paralysis below ankle which was unable to walk about one year ago. Patient has insufficient action on plantar flexion of ankle and has limited ROM of toes. Also, we found in standing position patient showed equinovarus deformity of ankle, claw toe deformity of foot and Achilles tightening about 6 cm. On AP standing view patient showed genu recurvatum and slightly elevation of right ankle joint. To correct these deformities, we did tibialis anterior tendon transfer, flexor hallucis longus graft, plantar fasciotomy and ilizarov external fixator applied. AP standing view after deformity correction showed genu recurvatum angle and hind foot alignment was improved and patient feel much better than before surgery.

Discussion: Genu recurvatum deformations are unordinary before adding up to knee arthroplasty, happening in under 1% of patients. In view of its irregularity, concern may exist with respect to the repeat of the deformation and the potential for flimsiness after TKA. Recurvatum might be related with an extreme rigid distortion, including genu valgum, capsular or ligamentous laxity and once in a while, neuromuscular illness. Within the sight of the last mentioned, a plantar flexion contracture of the lower leg additionally might be available. Subsequently, particular consideration ought to be offered preoperatively to assessment of the quadriceps, hamstrings and gastrocnemius complex. Since genu recurvatum is known to repeat in patients with certain neuromuscular issue, the etiology of the hyperextension disfigurement must be explained altogether before medical procedure. Without neuromuscular malady, be that as it may, hyperextension disfigurements tend not to repeat after TKA. Over the past few years, many different procedures for the correction of genu recurvatum have been proposed. The least technically challenging approach is to tighten the extension gap by underresecting the distal femur, using a thicker polyethylene liner and placing the femoral component in slight flexion. Another option is to use a rotating-hinge TKA with an extension stop to reduce the risk of hyperextension instability postoperatively. We focused on the problem of ankle joint due to genu recurvatum and performed an anterior tibialis tendon transfer and plantar fasciotomy as the main operation for soft tissue surgery to correct the malalignment of hind foot and correct the following claw tow deformity. We experienced a satisfactory case in which genu recurvatum was also corrected as a result of the corrected ankle joint.

Biography

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Traumatic popliteal artery entrapment syndrome

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A 20-year-old man presented 1 month history of left calf pain with limping and coldness. He is a soldier. He fell into a tank hatch by accident 1 month ago. After that accident, he had left calf clamping pain and limping gait. He had no past medical history. His left lower leg was cold and left foot color was paler. The motor power was decreased to grade 4 and the sensory deficit was 5/10. His left popliteal artery pulse was slightly decreased and dorsalis pedis artery pulse was weak. The simple X-ray showed no bony abnormalities. The ultrasound showed decreased amplitude of left proximal popliteal artery and disappeared biphasic pattern of distal left popliteal artery compared with right popliteal artery. But peripheral CT angiography showed no significant luminal narrowing of both lower leg arteries. We couldn't perform ankle-brachial index because patient's pain was severe during tourniquet compression. So, we checked Digital Infrared Thermal Imaging (DITI). In the DITI, there was no visible thermal imaging of left below the knee level and it means the left lower leg temperature was below the 26 degree. The MRA showed decreased left artery size below popliteal artery compared with right artery and MRI showed swelling and edema of left posterior deep muscle. So, we performed peripheral angiogram, we can find the short segment narrowing of left popliteal artery. He was performed popliteal artery angioplasty with saphenous vein patch. At post operation 10 days, DITI showed increased left leg temperature difference between left and right leg. Therefore, his final diagnosis was traumatic popliteal artery entrapment syndrome. And DITI is a useful and non-invasive diagnostic tool for evaluation of vascular insufficiency.

Biography

Hyun Hee Choi has her expertise in evaluation and passion in improving the health. Her specialty and interesting subjects are coronary artery disease intervention and endovascular treatment of peripheral artery disease. She obtained degree of Physics in the Ewha Woman's University before being Doctor. She has tried to use her knowledge of physics to evaluation and improvement of medical department.

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Biomaterial advances in arthroplasty

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3D printing aims to deliver intricate biomedical devices based upon advanced diagnostic imaging. With the current upsurge in public interest and increasing access to low-cost printers, efforts are underway to produce patient-specific anatomical models, customized implants and individualized instrumentation. Examples include the development of disposable surgical saw guides and cutting blocks in total knee arthroplasty. These devices help minimize tissue loss and optimize the native biomechanics of the patient. This review explores the evolution of 3D printing technology in the context of biomaterials. It also aims to critiques the major challenges ahead in optimizing bioinks and biologic performance in bringing 3D bioprinting to clinical practice. Common materials include metals, bioceramics, synthetics and natural polymers; each has specific mechanical properties, processing methodology and cell-material interaction. Biofunctional biomaterials are an emerging class of materials that display adaptability and activity at every phase of bone growth. These biomaterials have been shown to promote osteogenic differentiation, improve calcium phosphate (CaP) precipitation and regulate osteoblast gene expression. When crafted to emulate the specific micro-environment of bone, polymer-surface modifications accelerate bony ingrowth. 3D printing holds promise as a scaffold for bone regeneration as precise control of the overall geometry and internal porous structure. The accompanying biomaterials may be successfully embedded within multi-cellular cocultures and specific growth factors modulated to optimize growth and fixation. Bioceramics such as Hydroxyapatite (HA), calcium phosphate and bio glass are osteogenic and promote cell proliferation, though they have been shown to lack appropriate mechanical strength. Composite scaffolds of HA and tricalcium phosphate and Polycaprolactone (PCL)-HA with carbon backbones have been investigated to optimize biocompatibility and architecture to improve the porosity and mechanical strength of these constructs. Furthermore, microscale manipulation of biomaterials allows for integration of antimicrobial properties to combat infection.

Biography

Daniel Li has participated in a wide variety of both basic and clinical research regarding biomaterials in the context of orthopedic applications, such as the use of hydrogels as a novel drug-eluting mechanism to combat osteomyelitis and tuberculosis infection. He has spent significant time overseas with the Orthopedics Department at the 309th Hospital of the PLA in Beijing, China, working under the team of Dr. Yuanzheng Ma, as well as completing his undergraduate degree of BS in Materials Science and Engineering at the University of Illinois, where he conducted research under the John Rogers Research Group investigating novel biodegradable electronics. Currently, he is performing clinical outcomes research at Northwestern University regarding the evaluation of prosthetic joint infection.

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Accepted Abstracts





Outcome of uncemented total hip arthroplasty in failed primary replacement

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Introduction: Hemiarthroplasty (unipolar/bipolar) of the hip is a commonly performed procedure in elderly patients with intracapsular displaced fractures of the neck of the femur with good short-term results with regard to pain relief, return of activity, morbidity and mortality. Although bipolar hemiarthroplasty has been advocated for fracture neck of femur and few arthritic conditions of the hip joint, the results have not been very gratifying and it has largely been given up in favor of total hip replacement. Long term problems associated with hemiarthroplasty include progressive acetabular cartilage degeneration and concomitant groin pain, protrusio, stem loosening and subsidence and very poor results have been reported in active patients.

Methods: This is a prospective study carried out on 32 patients of revision total hip arthroplasty operated in our institute, Balaji Institute of Surgery, Research and Rehabilitation for the Disabled (BIRRD), Tirupati, from October 2011 to November 2017. Patients with failed primary hip arthroplasty due to aseptic loosening, protrusio acetabuli, dislocation, breakage of implant leading to loss of function, periprosthetic fracture, acetabular osteolysis are included in our study. Patients with failed internal fixation of proximal femoral fractures and infected primary hip arthroplasty are excluded from the study. The deformity, Range Of Movements (ROM) and limb length discrepancy were measured for all the patients in the standard pro forma. All the patients were operated by posterior approach (Moore's approach) to hip joint. In patients with primary cemented arthroplasty and cemented hemiarthroplasty, extended trochanteric osteotomy was done for the removal of bone cement and followed by closure with circumferential stainless steel wiring. Student's paired t-test was used to find out the significance of difference between pre-operative and post-operative Harris Hip Score.

Results: The average pre-operative Harris Hip Score was 45.28 and the Harris Hip Score at most recent follow-up was 80.28. The result was excellent in 8 patients, Good in 13 patients, fair in 8 patients and poor in 3 patients. About 20% of the cases presented with pain postoperatively till the last follow-up, of which five cases reported mild pain with no effect on average activities and one case reported with moderate pain with some limitation of ordinary activity or work. Two cases presented with anterior thigh pain and one case with foot drop which was not recovered till their last follow-up.

Conclusion: Uncemented revision total hip arthroplasty is the procedure of choice for the patients with failed primary total hip arthroplasty or hemiarthroplasty providing pain relief, preservation of mobility, range of motion and easy rehabilitation. Modular series of uncemented total hip prosthesis is the implant of choice as it provides stability and bone ingrowth. Extended trochanteric osteotomy of the proximal femur allows complete removal of the broken femoral stem and bone cement with preservation of blood supply resulted in good bone healing. Complications like aseptic loosening and particle wear requiring re-revision have not been found in our study. Long term follow-up of the cases is required for the analysis of both clinical and radiological outcome.

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10-year experience of a new MIS-2 incision total hip arthroplasty

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The purpose of MIS (Minimally Invasive Surgery) was to make tissue injury as little as possible during surgery enabling the patients recover quickly. Even though there have been some controversies regarding the advantages and the risks of the MIS, a great effort have been made to reduce the injury of normal tissues in the hip arthroplasty in the recent years. The author started to perform one-incision MI-THA since 2001 and two-incision MI-THA since 2003. The MIS-1 incision THA mainly decreased the size of skin incision and slightly decreased the injury of muscle, tendon, capsule and ligament. However, MIS- 2 incision THA mainly decreased the injury of muscles, tendon, capsule and ligament. However, MIS- 2 incision THA mainly decreased the injury of muscles which is very important for early rehabilitation and better function. In the review of consecutive 225 initial cases, the mean operative time was 70 minutes (range 50 to 115 minutes). Patients could walk on crutches at 1.5 days (range 0-4 days) and used crutch for 3 weeks on average. Patients were able to walk upstairs without a support at 4 weeks. Radiographic analysis showed the mean lateral opening angle and anteversion of the acetabular components were 43.0 degree (range 35 to 49 degree) and 17.3 degree (range 11 to 25 degree) and 97% of the femoral stems in neutral alignment. Based on author's personal experience of more than 2500 cases with a new MIS-2 incision total hip arthroplasty, the surgery could be performed safely in patients with osteoarthritis, osteonecrosis, rheumatoid arthritis, ankylosing spondylitis and femoral neck fractures. The contraindication for this technique was coxarthrosis with dysplasia either in acetabulum or proximal femur. With experience, the surgery time and complications gradually decreased. This technique provided the patients much more stability and satisfaction due to the preservation of muscles surrounding the hip joint with acceptable rate of complications.

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Arthroscopic treatment of ankle impingement syndrome

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Ankle impingement is defined as a painful mechanical limitation of full ankle range of motion secondary to an osseous or soft tissue abnormality. The purpose of the study was to evaluate the functional outcome of arthroscopic treatment of ankle impingement syndromes. In this case series study, 15 patients of ankle impingement syndrome underwent arthroscopic debridement and drilling if there was osteochondritis dissecans of the talus. Four different types of impingement lesions were found intraoperatively, Synovial hypertrophy was found in 8 cases (53.3%), fibrofatty scarred tissue was found in 4 patients (26.7%) anterior tibial spur was found in 2 cases and meniscoid lesion was found in one case (6.7%). All the patients were evaluated preoperatively and at the interval visit of 3 and 6 months postoperatively according to Meislin's criteria and ankle society (AOFAS) hind foot scale. The mean AOFAS score increased from 56.93 ± 9.60 (range, 42-77) before surgery to 86.73 ± 6.32 (range, 73-97) and to 90.60 ± 7.48 (range, 73-98) at 3 and 6 months follow-up respectively (p<0.003). Arthroscopic treatment of ankle impingement syndrome is recommended as the treatment of choice.

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Treatment of proximal femur osteomyelitis occurred after proximal femoral nail anti-rotation fixation with antibiotic cement-coated tibia intramedullary nail: A case report

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Introduction: Antibiotic cement-coated intramedullary nails maintain a locally high antibiotic concentration while contributing to bone stability. We present a case of femoral subtrochanteric fracture in a patient with an infected nonunion who was successfully treated for an infection and nonunion using an antibiotic cement-coated tibial intramedullary nail.

Case Report: A 79-year-old woman with a right femoral subtrochanteric fracture underwent internal fixation using Proximal Femoral Nail Antirotation (PFNA). She developed osteomyelitis with nonunion at the surgical site, 10 months postoperatively. A two-stage surgery, including removal of the existing PFNA to treat the infection and stable fixation to treat the nonunion, is generally performed but requires a prolonged hospitalization period. We therefore decided to insert an antibiotic cement-coated intramedullary nail in a one-stage surgery. However, the patient's diaphysis of the femur was too shallow to insert the antibiotic cement-coated intramedullary nail, even when using the smallest femoral intramedullary nail. Stable fixation could not be achieved using an antibiotic cement-coated intramedullary nail with bone cement mixed with antibiotics, bone fixation was achieved by inserting the nail at the site of the PFNA. The patient's symptoms improved, symptoms from the infection disappeared and bone union was confirmed.

Discussion: Osteomyelitis occurred because of postoperative infection following a proximal femoral fracture. Antibiotic cementcoated tibial intramedullary nails are effective option to treat patients with osteomyelitis of the femur and achieve bone union where nonunion persists with a shallow intramedullary femoral canal.

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Survivorship analysis of Arthroplasty procedures

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Objective: To evaluate the 10-year outcome of Arthroplasty procedures register in view of revision rate and complications.

Materials & Methods: In this analysis, we included THA and TKA cases since 2007. We identified cases with primary index was recorded in Arthroplasty procedures register whether the revision was recorded in the register or was done in other hospitals which are not included in Arthroplasty procedures registry. TKA and THA with a ratio: 1.39 to 1.0. Implants used were from the companies J & J, Zimmer, Stryker, Biomet, Link, Corin, Samo, Implant Cast, Implant International, Surgical and Hippocrat. Kaplan Myers test was used for survivorship analysis.

Results: For THA: Mean age was 51 years (19-86), female to male ratio was 1.15:1. Indications were pediatrics hip diseases, failed Open reduction and internal fixation (ORIF) of # NoF, Avascular Necrosis (AVN), post traumatic and Osteoarthritis (OA). Uncemented THA was 85%, cemented 10% and hybrid 5%. Primary THA was 49%, complex primary 30%, while revision 21%. For TKA: A female to male ratio was 3.14:1. The indication was OA in 73%. 47% had severe varus and 15 17% had significant bone defect. Both THA and TKA had a revision rate of 2% and their implants were made by 8 companies. The incidence of infection was 2% in the absence of laminar flow, space gown and pulse lavage. Hip and knee instrumentation systems are not stocked in hospitals and they are used as loan on a case per case basis. Unexpected results are unnecessarily dependent on Surgeons but could also be due to the young age and indications of THA other than OA, the high % of complex THA & TKA are due to late presentations and complex pathology.

Discussion & Conclusion: This study has limitations as the primary outcome measure was revision. There is a possibility of undiagnosed failure or those who lost to follow up. It is difficult to estimate the true incidence of infection. However, it appears that in the presence of limited resources, the incidence of failure is not as high as it was thought. In developing countries, the availability and the selection of implants are different from developed countries. This could have an adverse effect on the outcome and survival of hip and knee arthroplasty. These were influenced by economic constraints and training and had significant effect on complication rate and survival of implants.

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Calcaneal lengthening for the pes planovalgus foot deformity in children with cerebral palsy

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The objective of this study was to evaluate the operative management of pes planovalgus deformity in ambulatory Cerebral Palsy (CP) children by calcaneal lengthening osteotomy described by Evans. Fifteen children (10 girls and 5 boys) with average age 11 years 6 months (range, 8 years 4 months to 14 years 6 months) with 22 feet with Pes Planovalgus (PPV) deformity were included in this study. Clinical evaluation was made according to Dogan's scale and graded as perfect, good, fair and poor. Preoperative and postoperative radiological assessment of anteroposterior Talo-first metatarsal angle (AP-T1MT), anteroposterior Talo-calcaneal angle (AP-TC), lateral Talo-first metatarsal angle (Lat. T1MT), lateral Talo-calcaneal angle (Lat. TC) and lateral Calcaneal pitch angle (Lat. CP) had been done for all feet. All feet were corrected with modification of the calcaneal lengthening osteotomy described by Evans. Clinical results were perfect in 18 feet (82%), good in 2 feet (9%) and fair in 2 feet (9%). Radiological results showed improvement in 20 feet, while 2 feet showed no improvement. The improvement was significant in Lat. T1MT (P<0.001), AP-T1MT (P<0.05), AP-TC and Lat. CP (P<0.001, P<0.001, respectively) whereas it was insignificant in Lat. TC (P>0.05). The results of the present study showed that the procedure reliably relieves pain in PPV foot in CP children and proved effective in addressing all components of the deformity in both hindfoot and forefoot clinically and radiographically.

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Hip replacement differences between three main access surgery way functional study

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The aim of this study is analyzing clinical and functional preliminary results of patients underwent total hip replacement through three different access ways. The innovation of this study is to show the difference in the functional recovery between three main access surgery ways. A cohort of 75 patients (36 women and 39 men) was analyzed. The patients, after surgery replacement of hip were analyzed through biomechanics and electromyographic study. Clinical results showed that Hueter (anterior access) offers a kinematic activity in the post-operative recovery, in the short and average term (6 weeks-2 years) overall slightly higher than the lateral postero and definitely superior to the direct lateral approach.

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Clinical application: The changing landscape in allografts

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Processing and classification of most human cell and cellular based tissue products has remained the same for decades. The basic homologous function of transplanted osteocondrial allografts and total joint replacements utilizing allografts has fundamentally followed suite. However, guidance from the United States Food and Drug Administration may shift some of these approaches and the grafts which are available for implantation or transplantation. The purpose of this presentation is to review and evaluate changes in processing, distribution, classifications and possible shift in the United States tissue banking community to medical devices and biologics as a result of this guidance providing and developing different options in arthroplasty. The Learning Objectives and expected outcomes of this study is to Outline previous guidance and regulation, Summarize the current options and limitations in human cell and cellular based tissue products, to review potential changes in guidance and regulation and finally to summarize the impact and potential changes to arthroplastic allograft application

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The effect of humeral inclination on post-operative range of motion following reverse shoulder arthroplasty

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Reverse total shoulder arthroplasty has gained increasing popularity over the past several years. It has become a reliable surgery for patients with significant glenohumeral arthritis without a rotator cuff and an intact deltoid. Expected outcomes from a reverse total shoulder arthroplasty are decreased pain, but post-operative range of motion is unpredictable. Based on outcomes in our practice, we hypothesized that humeral inclination in various implants, including a 155 degree and 147-degree neck shaft angle, would affect post-operative range of motion. We retrospectively reviewed 27 patients, 15 patients with a 155 stem and 12 patients with a 147 stem. There was no difference in patient age at time of surgery or type of medical comorbidities. We chose to focus on forward flexion range of motion. We found that patients with the 155-stem had on average a 53-degree improvement in forward flexion compared to their preoperative range of motion. The patients with the 147-stem had 40-degree improvement in range of motion. In summary, patients with the 155 implants had better post-operative forward flexion when compared to the 145 stems.

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Guided growth in Blount's disease

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In 1966, Walter P. Blount describes osteochondrosis deformans tibiae, an epiphyseal and metaphyseal lesion of the proximal tibia. Blount's disease is commonly attributed to an intrinsic, idiopathic defect in the posteromedial proximal tibial physis resulting in progressive bowing of the leg, Intoeing and lateral knee thrust. Not easy to manage and follow. Traditionally treatment depends on patient's age and surgeons' preference. Permanent joint damage and deformity can be sustained if left untreated. Early on the disease (<4 years), bracing has been utilized, yet the effectiveness is controversial. Majority of cases require surgical intervention in a form of proximal tibial osteotomy, which is technically challenging with higher potential complications (NV injury, compartment syndrome, infections). Hemiepiphysiodesis has the advantage of being less invasive procedure with fewer major complications. Lateral tibial hemiepiphysiodesis in Blount's disease was previously described in a 1992 in case series. The literature was quite generous discussing this topic since but it still insufficient in some aspects, minimal invasive procedure, cost effective, pain management, no post-op immobilization, early weight bearing and limited complications. Hemiepiphysiodesis is safe and effective first line of treatment for skeletally immature patients. Surgical decision-making must weigh the safety and simplicity of this procedure against the much more extensive but much more predicable realignment obtained with osteotomy procedures. Technical issues are avoid mechanical failure by using solid stainless screw, pre-drilling the cortex and avoid wide divergence, initially plate coaptation to the bone (2 plates, 4 holes plate), and if varus recurs, re-do the procedure. Follow patients till skeletal maturity. Literature lacks proper description of surgical placement and location of TBP. All modalities of treatment talks about offloading the physis, were non-describes dealing with the pathology itself.

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