Title : Supra Malleolar Osteotomies for Neglected Tibial Deformity Affecting the Ankle and Foot Pasquale Cancelliere DPM, Attending Surgeon, MetroWest Medical Center Framingham, MA, USA drpc78@gmail.com

Ankle arthrosis continues to affect millions of people worldwide. Whereas it is not as common as hip and knee arthrosis in the aging population, it is more and more prevalent in the younger population. Also, it is not uncommon to see total destruction of the ankle joint in the neuropathic population. Whereas arthrosis of the knee and hip is mostly "wear and tear" type, the vast majority of ankle arthrosis is post traumatic. Because of this the likely hood of an underlying post traumatic deformity is high. Post Traumatic Deformity is often disabling particularly in the case of osteomyelitis treatment and open fractures with bone loss. This leads to a painful, non plantigrade, non functional limb. Consequently, the surgeon needs to perform complete and methodic pre-operative planning prior to performing any definitive reconstructive joint surgery. Ankle arthrodesis continues to be the standard of care for end stage ankle arthrosis. It is a tried and true procedure that provides the surgeon and patient, predictable union rates, low rate of complications and ultimately, gives acceptable AOFAS score, indicating a good post-surgical quality of life to the patient. However, arthrodesis is not without disadvantages. Over the last 10 years, however total ankle replacement (TAR), has become a growing and more widely accepted alternative to arthrodesis. New systems have improved instrumentation, shorter operating room time and fewer complications as well as improved functional outcomes. This procedure is also not without significant possible complications and disadvantages. Also, distraction ankle arthroplasty has shown to provide favorable short term and medium term favorable outcomes.

However, regardless of the procedure selected by the surgeon and patient for the treatment of ankle arthritis, there is one principle that is ubiquitous but unfortunately often overlooked. This iatrogenic negligence leads to increased non-union rates, continued pain and ultimately loss of functionality of the limb. The authors of this paper have encountered several failed ankle arthrodeses and TAR's because of this which required extensive revisional reconstructive surgery.

Introduction-

Whether the surgeon and patient elect to proceed with a TAR or Ankle Arthrodesis, the objectives of the surgery remain grossly identical. The goal of arthrodesis or TAR is to relieve pain and restore a functional, plantigrade limb. Both procedures share the indication of curing painful end stage arthrosis of the ankle, after conservative measures have failed. The advantage of TAR over arthrodesis is that it restores some range of motion of the ankle and that it limits the extent of arthritis which develops in the adjacent joints [1,2]. Often this leads to requiring subsequent arthrodesis in those joints. In a study by Esprarragoza [3], the perceived quality of life of patients who had undergone TAR was superior to patients who underwent Arthrodesis. However, this study was based on preoperative AOFAS scores and post-operative AOFAS scores at an average of 25.2 months. With AOFAS scores taking into account range of motion, this unfairly favors arthroplasty. To date, ankle arthrodesis remains the gold standard for painful end stage arthrosis.

Also, although total ankle arthroplasty effectively relieves pain, it does restrict the patient from high impact activities such as running. Also the patient profile who is a good candidate for ankle replacement is much narrower than the patient profile for ankle arthrodesis. The most common disqualifier for patient seeking replacements in the authors' practice is the neuropathic ankle.

However, both procedures, require one universal pre requisite in order for a good outcome. There must be no inherent deformity to the lower extremity. Both an ankle arthrodesis and TAR will not be successful if placed in a lower limb with a deviated mechanical axis, especially if the deformity exceeds the compensation available at the adjacent joints.

Preoperative Planning-

In the authors' practice, when evaluating a patient who might be a candidate for a hind foot arthrodesis or joint replacement, a specific protocol is followed every time in order to achieve an accurate diagnosis and appropriately treat the patient. This has allowed for consistently favourable clinical outcomes. A thorough and complete medical history exam is obtained. Factors that are of particular relevance are congenital versus acquired etiologies, comorbidities, lifestyle habits, and risk factors for postoperative complications and/or poor healing. The second step involves static physical exam and gait analysis. Gait analysis should be methodic. It begins from observing overall symmetry in shoulder level, hip level, knee, and ankles.

Asymmetric circumduction of the hips and excessive unilateral arm swing should be noted.Genu Valgum/Varum which exceeds anatomic limits, as well as knee hyperextension/flexion, equinus and calcaneal stance positions are all important.During static exam, subtalar joint position, spherion height, knee level and hip level as well as limb torsion all need to be identified.

The next part of the exam is the radiographic exam. Full limb radiographs including the pelvis and foot are necessary to discern wither there is a femoral, tibial or combined deformity or limb length discrepancy.Secondarily, weight bearing, full tibia radiographs including the tibial plateau and foot are paramount.Both Frontal and Sagittal plane views are obtained. For the purposes of this chapter/article, we will outline the measurements taken and their clinical significance, along with treatment algorithm by the plane of the radiographs.

Anterior Posterior views will identify Varum/Valgum, whereas Sagittal view will identify and procurvatum, recurvatum deformities. We also obtain ankle AP, LAT and Long Leg Calcaneal Axial Views are obtained.