SUMMARY

This case report is a moderate hallux valgus (HV) deformity due to first metatarsal cuneiform (M1-C1) instability. The patient attend the consultation for pain and deformity of de hallux ,causing him problems to walk and shoe wearing. In physical exam we observed the MC instability in axial plane so we deiced to do a lapidus. The procedure consist in fusion of MC joint in all planes checking the stabilitation with “the finger maneuvre” to be sure of the goal. then a cam walker boot is allowed with 15Kg of partial weight bearing for six weeks progressing into full weight bearing with a stabilizing shoe for another six weeks

Key words: metatarsal cuneiform instability, hallux valgus, lapides, axial plane, finger compression test

INTRODUCTION

First Metatarsal-cuneiform (M1-C1) instability is a well known cause of HV and HR and hence transference metatarsalgia with other forefoot deformities(1,2,5).This is because the first ray plays a significant role in the transfers of weight bearing forces during mid stance and toe off phases.Thus, if the first ray is unstable, the weight will transfer to the lateral aspect of the forefoot causing this deformities. There are many ways to treat HV moderate and severe deformity ,but arthrodesis of the first tarsometatarsal (TMT) joint was popularized by Lapidus in 1934 (7)and can provide a high degree of correction. We could see many ways to fix TMT joint and some of them miss the cause of the problem. For these reason we must take an anatomical and biomechanical approach to fix it. At this point we should first consider an appropriate physical exam exploring the main movements of the MC joint, transverse and sagittal, the first is not keep in mind and miss frequently, so could be the reason of many fail HV surgeries for a lack of stabilization. Nowadays we have the CT weight bearing(CT WB) study which we can measured the first MC instability, it is a new technology and more studies are need, but is promising to have a diagnostic tool (3)
Most studies are agree in plate and interfragmentary screw stabilization is better than any other form(only plate, two screws) but it is important to consider control de deforming
forces, and those are acting mainly in a transverse plane, so doing the correct maneuvers (first web space compression stress test) is crucial for surgery success (4)

CASE PRESENTATION

A 50 year old male presented with pain and weakness of the forefoot one year ago because a progressive deformity of the hallux. Clinical findings showed a M-C instability in sagittal and transverse plane
On X-ray can appreciate a more declination of the M-C joint that Lapidus pointed out as a cause of instability Fig 1
Surgery was indicated with a M1-C1 artrodhesis with plate and compression screw, buniectomie and akin fo the first phalange. Once the fusion is achieve we evaluate with first web compression test the stability in the transverse plane. If it persist we must fix with an additional screw from the first to the base of the second metatarsal, then we apply compression test again and check out that instability disappear
the patient was monitored the first six weeks with a stabilizing walker and 15Kg of partial weight bearing. After 6 weeks we recommend progressing into full weight bearing and using a more flexible stabilizing shoe for another 6 weeks

DISCUSSION

M1-C1 instability in HV could be a big challenge and a cause of failed surgeries if we not do a correct physical exam and apply the biomechanics principles in treatment.
We always must treat the deforming forces in HV, those acting in an axial plane and sagittal plane, so all our effort is to avoid it. In many cases the lisfranc ligament is damaged so is necessary a double check after the M1-C1 with a simple compression first web space test for a extra screw to stabilize, it is a simple but very important step to avoid post op failures

In the last decade publications about this issue has doubled, so there is a big interest on it. Introducction of CT WB could help to miss diagnostic and doing a correct treatment in operating room

Nowadays there is many ways to fix de M1-C1 instability, plantar, medial or dorsal plate, nailing and two screws, but few publications talk about the importance to control the deforming forces, and the only way is with a dorsomedial plate. So this is a very interest case to me because point out all the concepts that talking about before and change my mind on the treatment of those cases

I am very grateful for this stay with professor Valderrabano and thanks a lot to IBRA for making possible

AP and lateral weight bearing views pre op

this sequence of intra op X-ray show how first compression test rule out the persistent instability instead the first fixation, an additional M1 to M2 screw is necessary to stabilized

1. Lee HY
Multiplicar instability of the first tarsometatarsal joint in hallux valgus and hallux rigidus patients:a case-control study
Int Orthop.2022 Feb;46(2):255-263

2. Myerson MS
Hipermobility of the first ray
Foot Ankle Clin. 2000 Sep;5(3): 469-84

3. Geng X
Mobility of the first metatarsal-cuneiform joint in patients with and without hallux valgus: in vivo three-dimensional analysis using computerized tomography scan

4. An TW
Clinical Outcomes and rotational correction of first metatarsi-cuneiform fusion with first metatarsi-cuneiform fusion with metatarsal to second cuneiform fixation
Foot Ankle Orthop. 2022 Sep 30;7(3)

5. Mason LW
The first tarsometatarsal joint and its association with hallux valgus
Bone joint Res. 2012 Jun 1;1(6):99-103

6. Feilmeir M
Comparision of transverse and coronal plane stability at the first tarsal-metatarsal joint with multiple screw orientations
Foot Ankle Spec. 2017 Apr;10(2):104-108

7. Saud A
Lapidus Arthrodesis by anatomic dorsomedial plate
Techniques in foot and ankle surgery 2020 June;19 (2) 89-95