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DYNAMIZATION FOR DELAYED & NON-UNION FRACTURES OF FEMUR SHAFT

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Abstract:

Aim- the effects of Dynamization of Non-united & delayed union femoral shaft fractures treated with static Intramedullary nails is studied in this study.

Materials & Methods - in a series of 20 cases, during April 2015 to April 2017, in Maharaja institute of medical sciences. dynamization is done after 2-4 months of initial surgery. Successful union achieved in 85% cases.

Results – of 20 cases in this study 18 cases were male and 2 cases were female, average age of 32 yrs. Dynamization was successful in 17 cases and failure in 3 cases, exchange nailing was done for failure cases.

Conclusion - For Femur shaft fracture are commonly seen by orthopaedic surgeons especially in a rural setup. Before Intra-medullary interlocking nails were popular, K-nail was used for fracture shaft femur in 1970's, this K-Nail couldn't control the rotation of fragments so non-union and delayed union were notoriously common, more in proximal 1/3 rd. of femur. The complications like delayed/ nonunion after interlocking intra medullary nails if encountered the answer would be Dynamization. Our study tells the efficiency of dynamization and we Identified the factors causing success and failure. We analyzed the cost compared with exchange nailing, as we conducted the procedures in a rural setup (A Tribal belt area). Dynamization is enhancing callus formation in 85% of the cases. The percentage of union rate is more than before published rates. Our study suggest dynamization is the best alternative method to exchange nail.

Key words: DCP dynamic compression plate, IM Intra medullary.

Introduction

Nail dynamization is the removal of interlocking screw either proximal or distal to fracture site. Dynamic locking refers to placing screws at only one end of the nail. In static mode screws are inserted at both ends. The advantage of dynamic locking is it permits axial movements at fracture site, useful for fracture healing, so to correct the initial static locking to dynamic mode for fracture healing. Femoral shaft fractures are common injuries of high velocity trauma in India. It should be carried out only if fracture is not showing signs of consolidation between 12 to 16wks. Usually static locking gives stability, allowing maintenance of length and correct alignment. However, it doesn't allow axial loading of the fracture. dynamization by removing the screw from the longer segment. stability is maximized if screws near the fracture site are retained.

One must realize that predicting of degree of shortening by removing the screws (rarely). its advantages are minimal morbidity and immediate full weight bearing Reamed IM nails have brought popularity to treat these fractures, but delayed or nonunion can sometimes complicate. In the above-mentioned problems dynamization promote fracture healing in delayed & non-unions in our study to identify exact causes with success or failure. nail dynamization was routinely performed for all statistically locked nails 2 to 4 months after the index surgery.^{1,2}

Dynamization was very effective in promoting union in 85% of our cases. We concluded dynamization is a treatment for delayed or non-unions of femoral shaft fractures.

We feel dynamization an alternate to exchange nailing and other

procedures. In femoral fractures rates of union have been reported 90 to 98% with the use of IM nails. Previous rates of successful healing after dynamization ranged from 19% to 82%.^{3,4,6-10} Even technology has been improved, the problems with delayed non-unions continue to occur, for surgeons in rural setup. The usual treatment options for these two problems are: -

Nail dynamization, exchange nailing, bone grafting, dynamic compression plate, external fixator.

Dynamization is a daycare procedure. a very quick cost saving & effective method. It promotes fracturehealing. In our study, we did nail dynamization 8 to 10 weeks after surgery.

2 cases we did in 16 weeks. It is important to identify the factors causing failure.

Materials & methods

The study was done in our teaching institution M.I.M.S. we did 20 cases in 2 yrs. span april 2015 to march 2017.

We reviewed patient charts to identify. The information's like type of injury, open/ closed, pattern, associated injuries We also gave importance to diameter callus.

Exclusion criteria

Infective cases and open injuries, pathological fractures. Union is defined as no pain at the fractured site, no pain with weight bearing.

Surgical management

All procedures done at M.I.M.S Nellimarla, vizianagaram A.P (a teaching Institution in a rural setup) Infective cases are excluded from our study. Screws removal was performed as a day care surgery, and patient was advised to walk on 1st post-

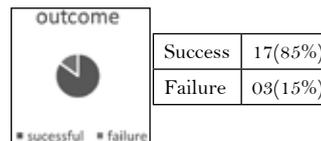
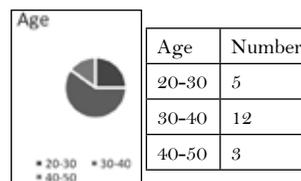
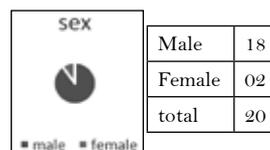
operatively.

Results

In total, the study identified 20 fractures in 20 patients. The group of 18 men and 2 women in present study. Average age at the time of surgery 32yrs (20-48)

Patient underwent dynamization on an average of 2- 4 months after initial surgery. fracture union occurs on average 2.5 months after dynamization.

Dynamization was successful in 17 of 20 patients, failure in 3 patients. Failed dynamization needed exchange nailing.



the factor that helped us for successful dynamization is the diameter of callus compared with the diameter at the time of dynamization.

Pre- operative radiographs with callus to diaphysis ratio notice and compared this with post-dynamization.

Cost for dynamization approx. – Rs 2000/-

Cost for exchange nailing approx. – Rs 25000/-



pre dynamization



post - dynamization

Discussion

The factor that helped for our successful dynamization was the diameter of the callus. compared with the diameter of callus prior to dynamization.

Open fracture at the time of initial injury correlated with dynamization failure.

Dynamization helps in increasing contact area at the fractured site and improve osteogenesis.

The above benefits in addition to its low morbidity of this procedure.

Its reduced cost, especially in Indian people, compared to Bone Grafting, exchange nailing, DCP.

Although dynamization was once routinely performed to help promote fracture healing, it is now performed selectively.^{5,10}

One factor is true, Dynamization is routinely unnecessary for fracture healing.

Sometimes its associated with risk of shortening. it appears that the fracture pattern is the greatest factor in determining whether a fracture will shorten after dynamization.^{4,8,9} As all know spiral, long oblique and comminuted fracture are at risk of shortening^{3,8}. Exchange nailing done for rotational deformity.

Callus formation correlates with increased fracture healing, & favorable vascular biological environment.

We should not emphasize importance of blood supply for fracture healing. The important issue to consider the nail dimensions,

its decreased cost comparing with exchange nailing and etc.

Our study gives information that can help success after Dynamization.

However, low morbidity, day care, easy procedure, quick recovery makes it a gold standard technique compared to exchange nail & etc.



pre - Dynamization



post - Dynamization

Conclusion

For delayed / nonunion shaft femur fractures we suggested timely Dynamization, and is effective procedure to promote healing. In our series of cases 85% effective. Risk factor was an open fracture and pathological fracture.

It's a method to promote healing of delayed or non- union when small gaps are present at fracture site.

Our study gives a message of Dynamization in accelerating fracture healing in addition to its low morbidity, low cost, especially in a rural setup, compared to DCP, exchange nails, bone grafting.

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