Effects of Immediate Post Operative Orthopaedic Rehabilitation in Lower Limb Open Reduction Internal Fixation's Orthopaedic Surgeries to Reduce Fear Avoidance Behaviour and Early Ambulation

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Abstract

Background : This study is to investigate the effects of immediate post operative orthopaedic Rehabilitation on lower limb. Orthopaedic internal fixations like proximal femoral nailing femur, Intramedullary nailing tibia to reduce fear avoidance belief and early ambulation. Which reduces the long stay duration in hospital and prevent post operative stiffness, other complications. This early mobilization improvesresolution of healing of wounds and pain. When compare to conventional methods of physiotherapy.

Materials and Methods: 45 subjects selected randomly and subdivided into 3 groups experiment. I=IPOR, n=15 Experiment II =conventional group, control group, n=15 subjects selected from inpatients post operative orthopaedic wards both female and males selected subjects are n=15 in each group being to age group (30-56) both male and female patients with fractures femur and tibia respectively primary outcome measures assessed by 3 different assessment questionnaire fear avoidance belief questionnaire and visual analogue pain scale for those who undergone physiotherapy for 10 days.

Results :3 groups of 10 days under supervision by physiotherapist inpatient orthopaedic wards and pretherapy FABQ (Fear avoidance belief questionnaire) and visual analogue scale pain scale questionnaire and post therapy after 10 days given among 3 groups experimental group 1. IPOR shows significant improvement in fear avoidance belief and early ambulation. So this early mobilization reduces pain stiffness and reduces the hospital stay. When compare to other 2 groups 'P' value shows difference, SD=+5 Anacova method statistical analysis done.

Conclusion : Immediate post operative orthopaedic rehabilitation which is more beneficial and effective in reducing, overcoming fear avoidance behaviour and enhances early ambulation which is more beneficial and enhances early ambulation which makes. Quick recovery in post operative orthopaedic surgeries when compare to other methods.

Keywords : *IPOR, PFN, IMLN, FABQ, VAS, gait training.*

Introduction

Mostly in all government and private corporate hospitals there are more common major in orthopaedic surgeries due to more road traffic accidents daily more than thousands of internal / External fixation and major replacement surgeries are more prevalent 75% in India, ends up with 10-15% post operative complications like joint stiffness, immobility, depression so adequate Immediate post operative care, education which reduces

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the fear avoidance behaviour, early mobility and enhance quality of life. This resounds quick resolution of wound healing, prevention of infection, Reduces length of hospital stay and restoration of normal life, mainly 40% of femur fractures treated with proximal femeral nailing and 30% of tibial fractures treated with intramedullary nailing. Mainly this research implicates how physiotherapy plays a vital role in post operative care and needs of all other orthopaedic surgeries. So physiotherapy is essential in all surgical orthopaedic implants fixation patients to get better outcome. Past may conventional methods in physiotherapy used to recommendedonly for patients ready for walking training with walker. But this research exposed immediate post operative physiotherapy used to prevent complications and reduces unnecessary fear and early ambulation and recovery.

Materials & Methods

Totally 45 subjects randomly selected in inpatient post operative orthopaedic wards from male and female wards in government medical college hospital, pudukkottai belong to age group (30-56) both male and female patients who are in post operative wards among them 7 cases of proximal femoral nailing fracture femur cases of male and females and 8 cases of intramedullary nailing in tibial fractures a maythe n=15 selected 3 groups among them 5 females and 10 males patients belong to each group.

FEAR AVOIDANCE BELEIF QUESTIONAIRE (FABQ)

It is a questionnaire, patients explained about level of fearness on movement physical activity and pain for example bending, lifting the leg etc. Questionaire consists of 10 items. Which clearly implicates fearfulness in early mobilization. This questionnaire translated in native language (tamil) given day 1 and day 10 for assessment.

1. My pain caused by physical activity

Completely disagree unsure completely agree

2. Physical activity like knee/hip/ankle movements makes my pain worse

(1,2) (3,4) (5,6)

Completely disagree unsure completely agree

(1,2) (3,4) (5,6)

3. Physical activity like knee/hip/ankle movements might harm my operated site (area)

Completely disagree unsurecompletely agree

(1,2) (3,4) (5,6)

4. I cannot do any movements because it may causes further damage to operated site.

Completely disagree unsure completely agree

(1,2) (3,4) (5,6)

5. When g do exercises as you teach my pain become more worsen.

Completely disagree unsure completely agree

(1,2)(3,4) (5,6)

6. I felt too much afraid, pain flar up and tired after physiotheraphy.

Completely disagree unsure completely agree

(1,2) (3,4) (5,6)

7. I felt much discomfort throughout day after completed physiotheraphy pain flares up.

Completely disagree unsure completely agree

(1,2) (3,4) (5,6)

8. My pain 10n movements is persisting throughout night improper sleep.

Completely agree unsure completely disagree

(1,2) (3,4) (5,6)

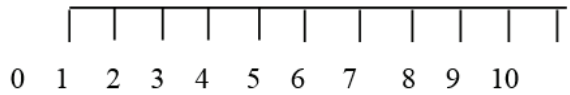
9. I am so fearful to do movements an day 1 post operatively.

Completely agree	unsure	completely disagree
(1,2)	(3,4)	(5,6)

10. I felt much depressed that g may be immobilized, not return to work.

Completely agree	unsure	completely disagree
(1,2)	(3,4)	(5,6)

Visual analogue pain numeric rating scale :



No pain

It is a 10cm numeric rating pain scale self reported format translated in tamil (native language) and repeatedly measures daily from day 1 to day 10 for the status of pain.

Ambulatory Status / Wound Healing

Ambulatory status :

1. Like non – weight bearing standing with walker.
2. NWB single normal leg hopping with walker.
3. NWB walking (single leg hop) with walker distance measurement and time duration.
4. NWB walking (single leg hop) with walker for activities daily living.

Toileting / self care/ access for bonelly.

Wound healing also can be assessed pre/post dressing daily progress of growth epithetial cells for 10 days staff nurses (or) health care provider.

Ambulatory status :

Daily progression of sitting, Non weight bearing standing gradually improves to non-weight bearing singlegtrophy with walker for more distance and 3 times daily which shows significant improvement in fear free / pain free early independent ambulatory status.

Above experiment test can be done by questionnaire for selected 45 subjects in 3 groups and answering prior and after experimental finding significant improvement

Types of Surgeries

1) Proximal femoral nailing :

Trochontric fracture is a fracture involving greater (or) lesser trachanters of the femur implant designed to treat proximal femoral fractures in trochanter area with a closed intramedullary fixation method longer nails are designed to treat low and extendedsubtrochanteric (or) combined trochantric and femoral shaft fractures.

2) Intramedullary nailing tibia :

Intramedullary nailing is the most popular and widely used method for treattibial shaft fractures intramedullary nailing involves minimal surgical dissection. Allowing preservation of blood supply by not disruply the soft tissue around the fracture

Its is nailing surgery to repair a broken bone tibia and keep it stable the most common bones fixed by this procedure are the thigh, shin, hip and upper arm. A permanent nail (or) rod is placed in to the center of the bone. It will help you be able to put weight on the bone

Physiotherapy :

IPOR (immediate postoperative orthopaedic rehabilitation). It is an early intervention immediately start after post operative orthopaedic lowerlimb surgeries to prevent long term complications like pain, stiffness and immobility as well as fear avoidance behaviour, this IPOR which reduces fear behaviour, prevent deep vein thrombosis, increase muscle strength, reduces joint stiffness and encourage early ambulation.

This ensures the activities of daily living of patients and reduces the hospital stay and make them confidence for independent walking.

Orthopaedic Rehabilitation :

It is an integral part of clinic management and continuation work with orthopaedic team to enhance patients recovery from long term complications, which succumbs the daily living activities and impaired theire economic burden so early physiotherapy plays a key role.

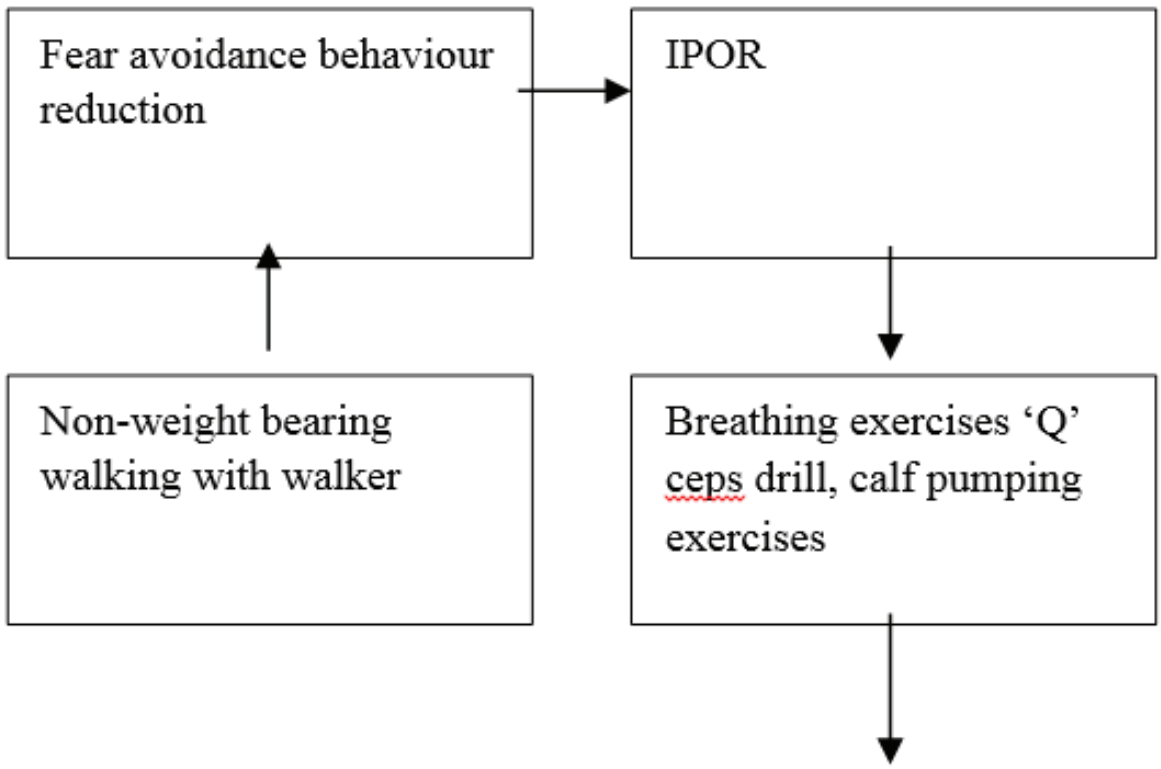
Aim

1. To reduce pain and fear avoidance behaviour.
2. It is used as a preventive protocol of orthopaedic complications.
3. To increase muscle strength and improves joint range of motion.
4. To prevent deep vein thrombosis and enhances early ambulation.
5. To reduces length of hospital stay.

Complimentery Exercises

1. Breathing exercises /Q'ceps drill
2. Calf pumping exercises (squeeze) to prevent DVT.
3. Active joint range of mobility exercises.
4. Early sitting long /high and non-weight bearing standing with walker.
5. Non weight bearing with walker gait training under supervision.
6. Patient eduction to avoid fear behaviour and psychological confidence.

Sequential pattern of immediate postoperative orthopaedic Rehabilitation table (2)



'**Ambulatory Status Assessment**

1. Check the ability of non- weight bearing with walker standing – time frame

2. Post IPOR application after 10 days ability of ambulatory status non-weight bearing walking (single leghopping) distance and time frame (pre & post) can be checked for every patients thistool questionnaire FaBQ, pain scale and ambulatory status – can be assessed for 3 groups respectively.

The above questionnaire can be experimented for subsequent 10 days under the supervision of physiotherapist and discharge plan by orthopaedic surgeon.

Treatment Procedure

This was conducted for 15 subjects in each group 1st cycle for 5 days and then next 5days progressive mobilization exs and gait training .

Then pre/post experimentally patients was examined to find the significant difference in 3 variables like.

a) FABQ (fear avoidance belief questionnaire)

b) Pain scale visual analogue scale questionnaire

c) Ambulatory status

Cycle -1 Experimental groups :

This study started for 15 cases in post operative orthopaedic wards with open reduction internal fixation in femur and tibia to age group of (30-52).

Breathing exs, intensive Q' ceps exercises calf pumping exercises, gradually progress to active knee joint mobilization exercises started and progress to sitting / standing with walker in non weight bearing to over come fear avoidance behaviour and pain relief prevent joint stiffness and immobility supervised daily exercises and walking (single leg hopping) with walker patient education daily to get positive confidence and reassurance.

Cycle- II conventional group :

Exercises can be given for 15 patient as per/protocol like graded ankle toe movts /patellar movement. Static quadriceps exercises, static gluteal exercises for 3 to 4 days for post ORIF (PFN) femur and (IMLN) tibia for 5 days protocol. Then after 5 days graded knee joint mobility in long sitting along with other routine exercises 10th day progress to high sitting exercises so for 10 days under supervision of physiotherapist.

Cycle –III

15 patients treated in wards with as usual pain/ Antibiotics medications and dressing for wound management and refer physiotherapy for NWB gait training with walker on 9th (or) 10 day without doing any intensive physiotherapy /mobilization exercises in control group.

Cycle – IV

Only home exercises programme and walking the training to be taught at the time of discharge

Table -3 In this table the pre experiment pain scale FABQ ambulatory status and find the differences gained post experimentally from 20% to 80% of significant improvement

Cycle	Pretest	Post test	Mean	SD
Cycle IPOR	Pain -10cm	80% IPOR	30.2	5.1
	FABQ -5 ambulation status – 3secs 15-20%			
Cycle II conventional group	15	79%	28.2%	4.3%

Above table (3) shows 80% of significant improvement in IPOR group after 10 days. This table shows improvement in patient post operative period by moderate amount and recovery of pain and fear avoidance belief present.

Table – 4 shows below pre and post test

Cycle	Pretest	Post test	Mean	SD
Cycle –III	Severe 10cm FABQ 5.22%	43%	12.2	2.3
Cycle -IV	15	30%	10.5	1.8

Table:5 significant improvement in fear avoidance belief and ambulatory status pain level progress in experimental (IPOR) group more than other group

Group	Post experiment	SD	Pain	FABQ	Ambulation status
IPOR	80%	5.1	Mild pain	Completely agree 0 level	15 minutes to walk
Conventional group	40%	2.2	5cm	Moderade 5 level	Able to walk 5 minutes

Above comparative analysis shows significant improvement in IPOR experimental group post experimentally after 10 days respectively Tab -5

Discussion

This study shows significant improvement in reduction of pain overcome fear avoidance behaviour and enhances early ambulation to patients and also gives positive psychological confidence. [1]Hoyt, B. W et al 2015(1) rehabilitation of lower extremity trauma, a review of principles and military perspective on future directions, that early intervention in post operative physiotherapy strengthening exercises, early joint mobilization exercises reduces pain and fear and early mobility prevent risk of post operative bed ridden long term complications. [2]Llipoulos.E et al 2020(7),physiotherapy aftertibial plateau fracture fixation,a systematic reviews. Multidisciplinary early orthopaedic rehabilitation especially suggest immediate post operative orthopaedic rehabilitation is more effective and preventive physiotherapy for all orthopaedic surgery cases this may prevent the complications like joint stiffness vein thrombosis. Bed sores and immobility. So early active joint mobility exercises, calf pumping exercises and early encouragement of standing with walker which reduces post operative fear and pain along with patient education as a effective which gives positive effects.

Clinical Implications

IPOR and conventional methods are used as a physiotherapy speciality in post operative patients more effectively however, immediate post operative orthopaedic rehabilitation with complex of complimentary exercises protocol is used as a progrostic /preventive measures of post operative lowerlimb surgeries reveals early recovery / fracture union and independency. It helps greater extent for orthopaedic surgery cases.

Conclusion

This study shows clinical evidence physiotherapy (IPOR) is more effective and superior than conventional methods for pain reduction fear avoidance behaviour reduction & patient cooperation for early ambulation orthopaedic surgeries like post operative open reduction internal fixation like proximal femoral nailing and intramedullarytibial nailing and other major surgeries like joint replacementsurgeries also can be spared this study was conducted not generalised for specific procedures and age group population however heterogeneously like both males and female. This study should be conduced for more populationcal clearance:ethical clearance from government medical college hospital pudukkottai hospital ethical committeedone this study should be conduced for more population for some other orthopaedic major surgeries and their post operative rehabilitation in future.

References

1) Hoyt, B.W[1]., Pavey, G.J., Pasquina, P.F. et al:Rehabilitation of Lower Extremity Trauma: a Review of Principles and Military Perspective on Future Directions. Curr Trauma 2015; 1: 50–60 .
2) Yang, S. D., Ning, S. H., Zhang, L. H., Zhang, Y. Z., Ding, W. Y., & Yang, D.L: The effect of lower limb rehabilitation gymnastics on postoperative rehabilitation in elderly patients with femoral shaft fracture: A retrospective casecontrolstudy Medicine2016; 95(33), e4548.
3) BrumR. J., Toal, T. R., Jr, Murphy-Zane, M. S., Novak, V. P., & Belkoff, S. MM: Immediate weight-bearing after treatment of a comminuted fracture of the femoral shaft with a statically locked intramedullary nail: The Journal of bone and joint surgery:American volume1999; 81(11):1538–1544.
4) Paterno, M. V., & Archdeacon, M. T:Is there a standard rehabilitation protocol after femoral intramedullary nailing?:Journal of orthopaedic traumatrauma2009; 23(5 Suppl), S39–S46.
5) Agarwal-Harding, K. J., Meara, J. G., Greenberg, S. L., Hagander, L. E., Zurakowski, D., & Dyer, G. S: Estimating the global incidence of femoral fracture from road traffic collisions a literature review. The Journal of bone and joint surgery,American volume2015; 97(6)-e31.
6) Enninghorst, N., McDougall, D., Evans, J. A., Sisak, K., & Balogh, Z. J:Population-based epidemiology of femur shaft fractures: The journal of trauma and acute care surgery2013;74(6), 1516–1520.
7) Iliopoulos, E[2]., & Galanis, N: Physiotherapy after tibial plateau fracture fixation: A systematic review of the literature,SAGE open medicine;2020: 8-2050312120965316.
8) Dirschl, D. R., & Del Gaizo, D: Staged management of tibial plateau fractures. American journal of orthopedics (Belle Mead, N.J.)2007; 36(4 Suppl):12–17.
9) Braun, B. J., Veith, N. T., Rollmann, M., Orth, M., Fritz, T., Herath, S. C., Holstein, J. H., & Pohlemann, T:Weight-bearing recommendations after operative fracture treatment-fact or fiction? Gait results with and feasibility of a dynamic, continuous pedobarography insole: International orthopaedics2017; 41(8):1507–1512.
10) Wang, H., Huo, Y., Zhao, Y., Zhang, B., Yang, D., Yang, S., & Ding, WW: Clinical Rehabilitation Effect of Postoperative Lower-Limb Training on the Patients Undergoing OLIF Surgery: A Retrospective Study. Pain research & management 2020;1065202.