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Effects of tens vs IFT in patients on pain and function on osteoarthritis of knee: A randomized control trial

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Abstract
Background: The aim of the study was to find the effect of TENS vs IFT in patients on pain and function on osteoarthritis of knee with WOMAC index.
Methodology: 60 participants with OA knee of age between 50-70yrs were devided into three groups i.e Group A, Group B and Group C. The participants were examined with their prior permission after explaining the need of study. Subjects in Group A were treated with IFT and exercises Group B were treated with TENS and exercises and Group C were treated with only exercises. Each participant treateded 1week.
Result: The subjects in all the three groups after the treatment but there was significantly more decrease in pain among subjects in IFT group with difference of 47.95 so IFT is more effective to reduce pain as compared to TENS and conventional group. The p value for difference within scores in group was <0.0001 considered as extremely significant.
Conclusion: This study concludes that, IFT, TENS and exercises were effective in reducing WOMAC score. After comparison it showed that IFT was statistically more effective for pain relief stiffnesss and physical function than TENS and Exercises.

Keywords: oa knee, WOMAC index, tens, IFT, exercise

Introduction
Osteoarthritis may be defined as a condition characterized by progressive loss of articular cartilage within a joint resulting in pain. It had previously been classed as a non-inflammatory joint degeneration.
Osteoarthritis is frequently described to patients as 'wear and tear' that occurs with age; however, there are differences between the changes in articular cartilage that occur with age and those seen in osteoarthritis. The hyaline cartilage that lines synovial joints consists of chondrocytes and an extracellular matrix.
Knee osteoarthritis (OA) is a prevalent degenerative joint disease marked by progressive erosion of the articular cartilage and loss of joint space, often leading to slackening of the knee joint ligaments and increased joint laxity.
Osteoarthritis (OA) of the knee is the most common cause of chronic disability among the elderly worldwide. Radio graphical and pathological changes of osteoarthritis are present in most persons over the age of 60 years. Because the knee joint is weight bearing and contributes to ambulation, patients usually experience functional limitations in activities of daily living.

Aim and Objectives
1. Aim
- To find out the effect of TENS VS IFT on osteoarthritis of knee.

2. Objectives
- To find out the effect of TENS on function and pain on osteoarthritis of knee.
- To find out the effect of IFT on function and pain on osteoarthritis of knee.
- To compare the effect of TENS and IFT on function and pain on osteoarthritis of knee.

Methodology
- **Study design:** Randomize control trial
- **Study Setting:** Hospitals across Pune and TMV OPD
- **Sample population:** Patients with osteoarthritis of knee
- **Sampling Method:** Random
- **Sample Size:** 60= group A (n=20) group B (n=20) group C (n=20).
- **Inclusion Criteria**

1. 50-70 years age
2. Male and female
3. Diagnosed with osteoarthritis of knee

- **Exclusion Criteria**

1. Those who are not willing for participation
2. Patients with pacemaker
3. Patients with implant

- **Materials Required:** IFT, TENS, Pen, Paper, Consent form
- **Outcome Measure:** WOMAC scale

Procedure
Synopsis was approved by the ethical committee. Hospitals were approached and permission for data collection was received.
Subjects were selected on the basis of inclusion and exclusion

criteria. Consent form was filled and they were explained about aim and objective of the study. They were randomly divided into three groups.

1. Group A treated with IFT and exercise
2. Group B treated with TENS and exercise
3. Group C treated with exercise only

Group a intervention (IFT)

- The patient was in supine/sitting position. Then therapist applied IFT on affected knee four electrodes are used in two pairs, each pair being indicated by the colouring of the wire from the machine.
- The electrodes are placed diagonally opposite one another in such a way that the beat frequency is produced in the tissues.
- The intensity is controlled by the therapist and is equal to the sum of the two separate currents.
- Medium frequency is used for 15 min with 1 week treatment protocol.
- IFT was applied prior to each exercise session

Group B (tens) intervention.

- The subject was in supine/ sitting position. Therapist applied TENS on affected knee four electrodes are used in two pairs, each pair being indicated by the colouring of the wire from the machine.
- The electrodes are placed around the knee.
- A continuous frequency of 150Hz with same pulse duration was used and participant were instructed to use highest tolerable intensity. TENS was applied 15-20 min prior to each exercise session.

Group C control group intervention (exercises)

Knee static exercises

1. **Static quadriceps contraction exercise**
   Patient is in supine position with a roll towel or foam roller under your knee. Slowly press knee over the roll for 10secs and repeat 5 times.
2. **Static hamstring contraction exercise**
   Patient is in supine position with a roll towel or foam roller under your heel. Slowly press knee over the roll for 10secs and repeat 5 times.
3. **Isometric hip adduction exercise**
   Patient is in supine position. A small pillow was put between the knees. They were instructed to perform isometric hip adduction exercise while pressing the pillow between the knees to maintain the adduction with contraction for 10 secs and 5 repeatations.

Results

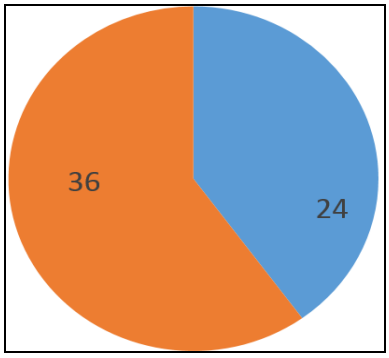

Fig 1: Age distribution

Interpretation

Result 1 shows that out of 60 sample sizes there are 24 individuals are in an age group of 50-60 years of age and there are 36 individuals are in an age group of 60-70 years of age group.

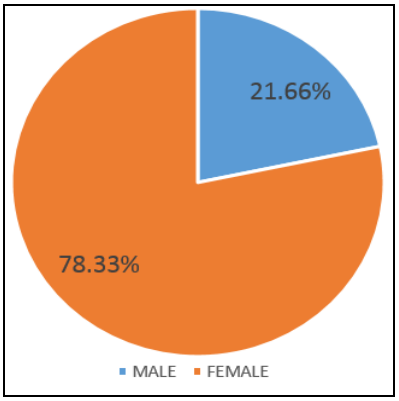

Fig 2: Gender Distribution Graph

Table 1

Males	Females
13	47

Interpretation

Result 2 show that out of 60 samples there were 13 males and 47 females who have osteoarthritis of knee joint.

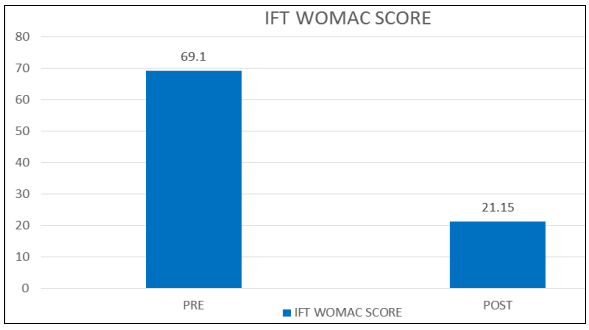

Fig 3: IFT with EXERCISE Pre-treatment and Post-treatment

Table 3

IFT	Pre	Post	PPP Value
Group A	69.1±13.102	21.15±7.436	<0.0001

Interpretation

Graph 3 shows that IFT pre treatment and post treatment WOMAC score in OA patients, Difference between pre and post treatment WOMAC score was 47.950 with p value <0.0001 which shows extremely significant.

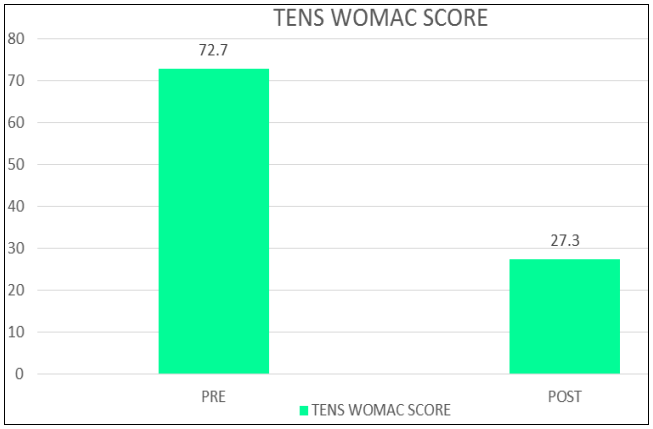

Fig 4: Tens with exercise pre-treatment and post-treatment

Table 4

	PRE	POST	PPP VALUE
Group B	72.7±8.785	27.3±7.305	<0.0001

Interpretation

Graph 4 shows that pre-treatment and post treatment WOMAC score in OA knee patients, Difference between pre and post treatment WOMAC score was 45.400 with p value <0.0001 which shows extremely significant.

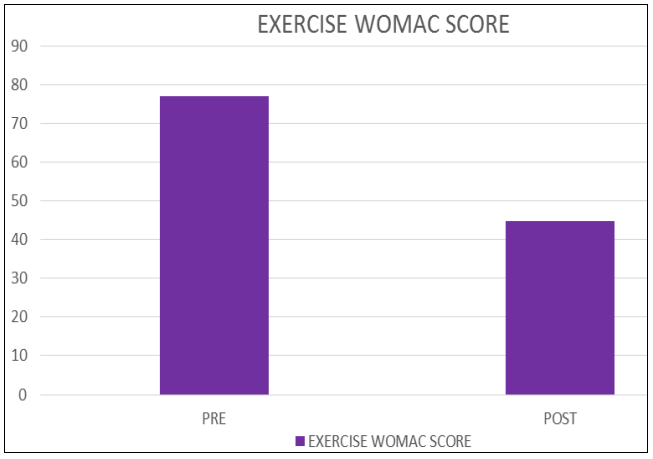

Fig 5: Exercise pre-treatment and post-treatment

Table 5

	Pre	Postvalueost	PPP value value
Group C	77.25±9.536	44.90±9.193	<0.0001

Interpretation

Graph 5 shows that pre-treatment and post treatment WOMAC score in OA knee patients, Difference between pre and post treatment WOMAC score was 32.350 with p value <0.0001 which shows extremely significant.

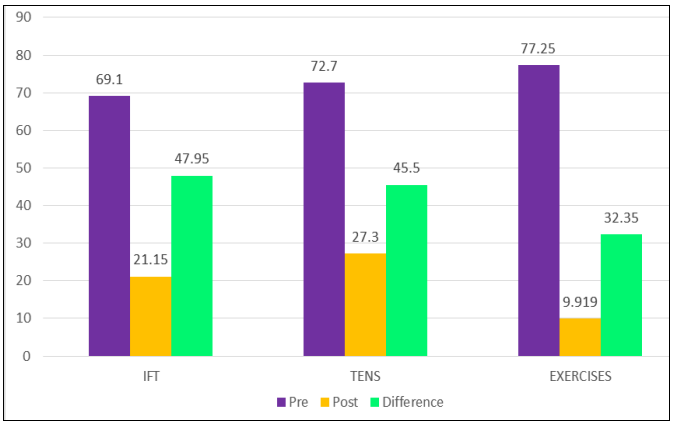

Fig 6: Comparison of Total WOMAC score of IFT TENS and Exercises

Table 6

	Pre	Post	Difference
IFT (A) MEAN+SD	69.1(13.102)	21.15(7.436)	47.95
TENS (B) Mean+SD	72.7(8.785)	27.3(7.385)	45.40
Exercises(C) Mean+SD	77.25(9.536)	44.9(9.193)	32.35

Interpretation

Graph 6 shows that, the subjects in all the three groups after the treatment but there was significantly more decrease in pain among subjects in IFT group with difference of 47.95 so IFT is more effective to reduce pain as compared to TENS and conventional group. The p value for difference within scores in group was <0.0001 considered as extremely significant.

Discussion

Osteoarthritis (OA) is one of the most important causes of chronic pain in the general population. Treatment of pain in patients with osteoarthritis is mainly with analgesic medications that can cause serious adverse events in long-term use. To avoid the adverse effects from these drugs other modalities have been introduced and their effectiveness has been demonstrated.

The present study demonstrated significant improvements in pain and WOMAC scores over a period of 4 weeks for all treatment groups. The addition of IFC or TENS to a programme of exercises alone, however, provide significantly improved clinical outcome.

All of the study participants had osteoarthritis of one or both knees, diagnosed by clinical symptoms and radiographic evidence, and the osteoarthritis was painful despite medical treatment. The protocols for IFT and TENS device setting and application varied widely between studies, as well as the outcome measures.

In this study we found that there was decrease in Pain, stiffness, improvement in physical function according to WOMAC (Western Ontario and Mcmaster University Osteoarthritic Index) scale in the subjects receiving the treatments when post treatment evaluation was done.

Conclusion

- This study concludes that, IFT, TENS and exercises were

effective in reducing WOMAC score.
- After comparison it showed that IFT was statistically more effective for pain relief stiffnesss and physical function than TENS and Exercises.

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