

The Effectiveness Of Customized Insoles And Customized Foot Wear In Combination With PEMF Therapy in Correting Lower Limb Deformities

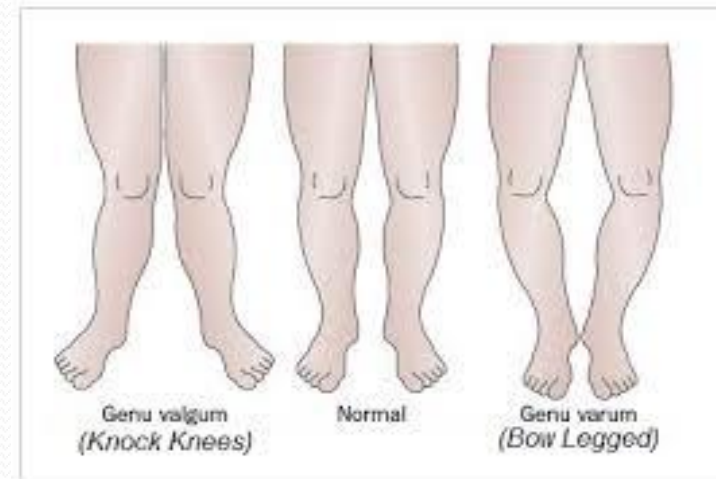
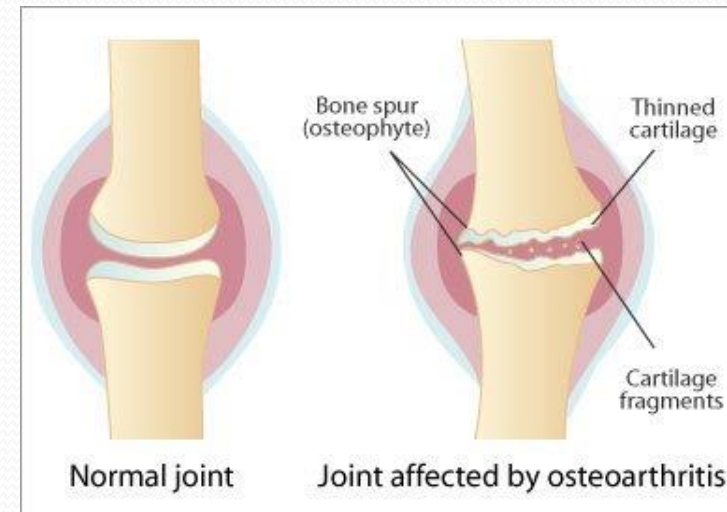
Authors-

Dr. Swapna Penugula, Prachi Kabra*, G.K
Kabra*, Dr. Shalini Nagavarapu*

**Magnetron Therapy and Research Centre, India.*

Introduction

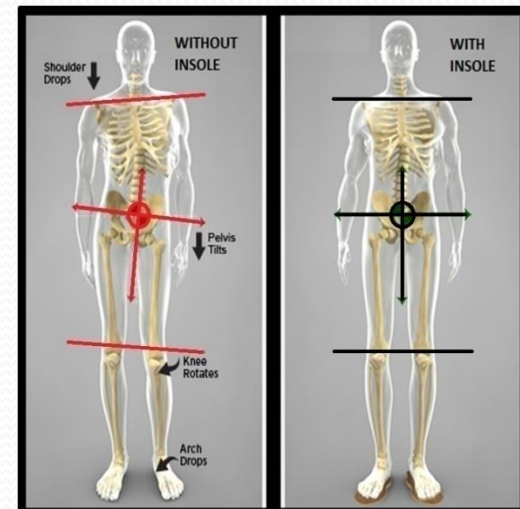
- Unattended foot and knee deformities like knock knee, bow knee, deviated calcaneal line, pronated foot, flat foot and high arch foot, osteoarthritis, etc leads to crippling circumstances in later stages of life.
- Decreasing the mobility and altering gait patterns and causing devastating pain limiting activities of daily living. There is a need for **non-invasive methods to improve stability and mobility.**



Alternate therapies for lower limb deformities

1. Customized foot match insoles and foot wear

- Realignment of deformed foot
- Even weight distribution
- Shock absorption
- Insole and foot wear together holds the foot in proper neutral position avoiding stress
- Bio mechanical correction at the foot and knee
- Improved gait pattern
- Unnecessary movements are restricted



2. Pulsed electro magnetic field therapy

- This treatment is based on the principle of restoring cell's resting potential by applying an external pulsed electromagnetic field.
- Restores normal potential and affects the ionic fluxes. The cell membrane potential helps reinstate normal cell function
- Ion exchange allows improved absorption of nutrients
- No side effects but only side benefits.

Objective

A comparative study was performed on the effectiveness of two non-invasive techniques namely

1. PEMF Therapy and
2. Customized insoles and Customized footwear as a **combination therapy** in improving the mobility and correcting lower limb deformities in patients .

Method

	No of patients	Given treatment
Group A	30	<ul style="list-style-type: none">•Pulsed electromagnetic field therapy•Customized foot match insoles and customized foot wear
Group B	30	<ul style="list-style-type: none">•Customized foot match insoles and customized foot wear
Group C	30	<ul style="list-style-type: none">•None•Taken as control group

All the subjects were between 60 to 70 age

Methodology

Assessment parameters are

1. Pain pattern-VAS scale
2. Range of motion- Goniometer
3. Gait pattern- Visual gait analysis
4. Center of gravity- Force plate
5. Oedema- measurement with inch tape
6. X rays before and after in standing position
- Treatment was given for a period of one month.

1. Initial assessment of patient

- Age of the patient is noted
- Deformity range is checked
- Range of motion is assessed both active and passive
- Pain pattern
- Range of waddling in gait if any.
- Oedema is measured.
- Deviation of center of gravity is taken.
- Medical history is taken.



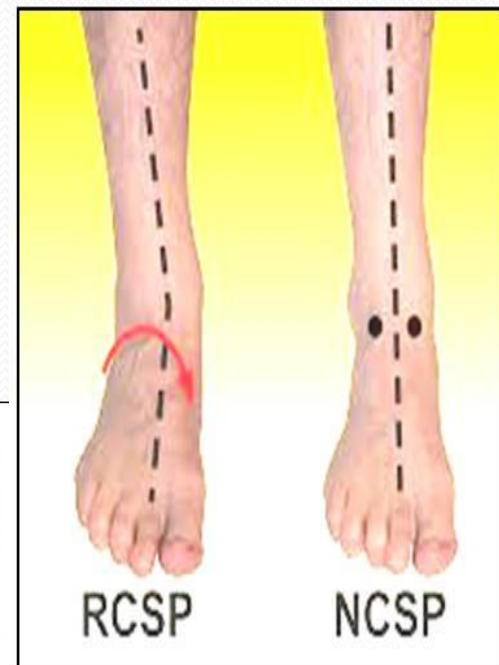
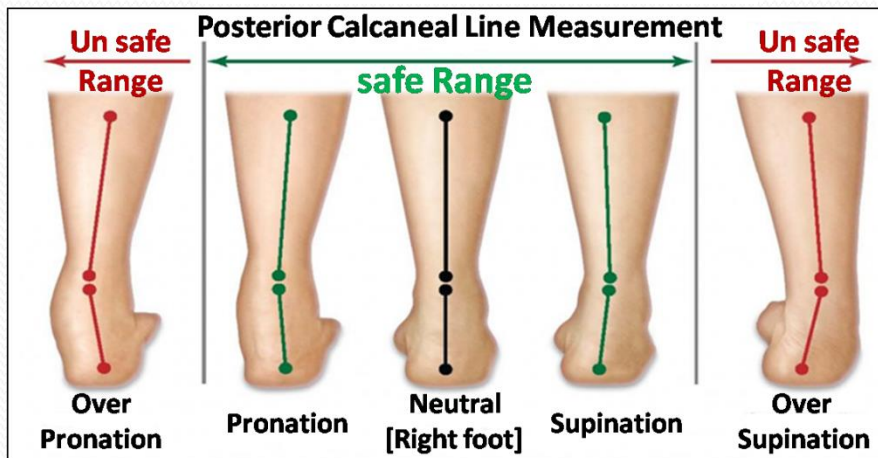
Thorough assessment of their feet were done using a series of steps and methods such as foot impression, limb length, foot valgus, anterior calcaneal line measurement and posterior calcaneal line measurement.



LIMB LENGTH



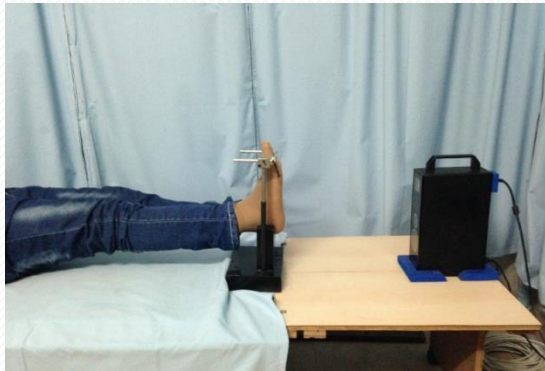
FOOT VALGUS



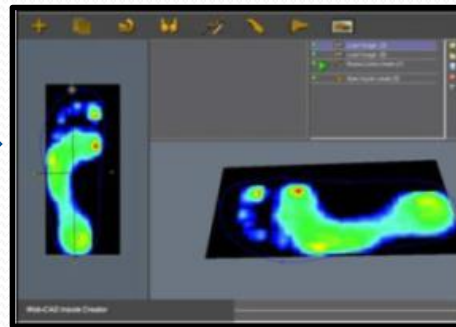
**ANTERIOR CALCANEAL
LINE MEASUREMENT**

Procedure

1. Manufacture of Customized “Foot-Match” Insoles



FOOT SCANNING using Vismach
3D scanner



3D FOOT MODIFICATIONS



3D CNC MACHINE



3D MILLED INSOLES

2. Customized footwear made to patients measurements



- Patients foot measurements were taken using this form.
- Customized footwear made to patients exact foot measurements
Customized insoles fitted inside these foot wear by Mr.Vazir.
- Corn and bunion relief given to patients within the footwear.
- Customized insoles along with customized foot wear and the foot will act as one unit to serve the purpose of correcting the deformity.

3. Pulsed Electromagnetic Field Therapy (PEMF)

- PEMF therapy given using MAGNETRON Therapy equipment.
- Patients were given specific treatments based on condition. They were given treatment for 30 minutes each day for 1 month. They were all given a green juice made by mixing various green leafy vegetables half an hour before the treatment. They were asked to remove all steel objects before taking treatment.



- Patients were also made to do various stretching and strengthening exercises before taking the treatment.



Results

1. Gait Pattern



	Group A	Group B	Group C
No of blocks	Increased a lot	Increased	No change
Speed of walking	Increased	Increased	No change
Walking aid Usage	Decreased	Decreased a bit	No change
Limp in the gait	Decreased greatly	Decreased	No change

2. Centre of Gravity

	Group A	Group B	Group C
Position of COG line	The COG line brought back from near adjacent to neutral line	The COG line brought back from near adjacent to neutral line	NO CHANGE



Force plate

3. Range of Motion

	Group A	Group B	Group C
Active	Increased	Increased	No change
Passive	Increased	Increased	No change



4. Pain

	Group A	Group B	Group C
VAS scale	Great relief	Moderate relief	No change



5.Oedema

Group A	Group B	Group C
Greatly reduced by 2.5 cm on an average	Moderately reduced by 1 cm on an average	No change



6. Comparison of X-rays Before and After

S.No	Changes in Knee X-ray	No. of Patients		
		Group A	Group B	Group C
1.	Cartilage building	Yes	No	No
2.	Increased gap	Yes	Yes	No

Case study- Mr. Manakchand Jain, aged 63, X-ray before treatment



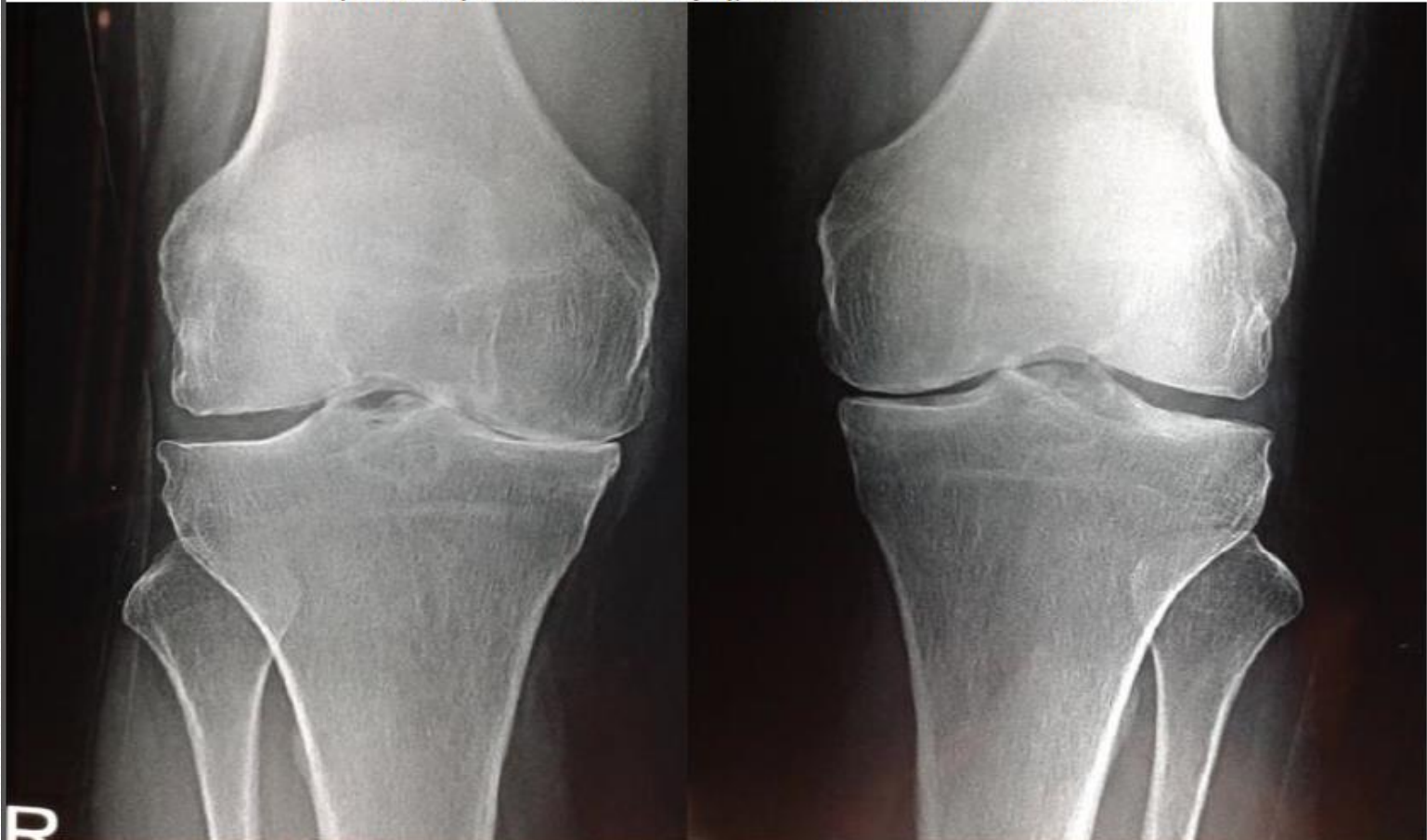
After treatment with PEMFT and customized foot match insoles

X-Ray dated 23,july,2013of patient Mr.Manakchand,male,aged 64 in standing position.

a)Patient was given Magnetron (PEMFT) treatment from march 18 to 23 july,2013 to build cartilage and reduce pains.

b)Patient was given Customized foot match insoles on 20 may,2013 and still using regularly.

c)This X-Ray was taken on 23rd july,2013 was with insoles in the shoes.



SDRC -Secunderabad Diagnostic & Research Centre info@sdrc.in

MR MANAK CHAND JAIN 64Y.M.23 JUL 13 BOTH KNEE AP/LAT 130723136

7. Over all Satisfaction

S.No	Overall satisfaction (Score 0-10)	No. of Patients		
		Group A	Group B	Group C
1.	No improvement (0)	-	-	27
2.	Little improvement (1-5)	-	5	3
3.	Improvement (5-8)	12	16	-
4.	Large improvement (8-10)	18	9	-

Results and Discussion

At the end of the trail period 5 parameters were included for comparing the improvement in the patients.

Separately for each group the result is given as no of patients where the change is observed/ total no of patients

Group	Pain	Range of motion	center of gravity	Gait pattern	oedema
Group A	28/30	30/30	26/30	29/30	19/25
Group B	27/30	19/30	26/30	29/30	10/25
Group C	3/30	-	-	-	-

Conclusion

- The study concluded that a combination therapy of PEMF therapy and Customized insoles and Customized shoes showed significant results in correcting lower limb deformity and restoring normal limb function.
- This will help provide an affordable and non-invasive method for aged people to correct their deformities and resume daily activities.

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Acknowledgment

- We thank the technical team of Magnetron Therapy and Research Centre and Foot Doctor Clinic for their help and support.
- We thank GK Kabra's Public Charitable Trust for funding this project.
- We thank the patients for their participation.



Thank you!