
Microcellular Rubber Insole in Management of Knee Osteoarthritis

Peer review status:

Yes

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Microcellular Rubber Insole in Management of Knee Osteoarthritis

Author(s): Prakash JS, Passi A, Prakash J, Bhatta S, Deane A

Abstract

Orthotic devices inside footwear have been used for long for various indications. Literature is available comparing shoe insoles made of various materials. We present our observations from a prospective study wherein for the first time microcellular rubber insoles were prescribed and used by 44 patients afflicted with osteoarthritis in 84 knees. Outcome analyses were based on WOMAC's index. The preliminary study on management of knee OA using microcellular rubber insoles bore effective and encouraging results.

Key words: Microcellular rubber, insoles, knee osteoarthritis, WOMAC score

Introduction

Although the history of studies of osteoarthritis [OA] spans over a century, the condition itself is age old. Mid 1990's witnessed the development of a new concept of OA as a group of different disorders [osteoarthritic diseases] that share common risk factors, pathogenesis and pathology [04]. Osteoarthritis, also sometimes called osteoarthrosis by purists, or degenerative joint disease, is not a single disease but rather the clinical and pathological outcome of a range of disorders and conditions that lead to pain, disability and structural failure in synovial joints. OA is commonest degenerative joint disease and affects knees, hips, hands and spine. It is characterised by degradation of joints, including cartilage surfaces and subchondral bone, causing joint space narrowing, pain, stiffness, swelling, tenderness and reduced physical function [11]. Knee is the commonest lower limb site for OA, with the disease affecting the tibiofemoral and patellofemoral joints either in isolation or in combination. Medial tibiofemoral compartment is the most commonly affected [medial 67% versus lateral 16%] [08]

Osteoarthritis may be primary [idiopathic], rarely occurring before 35, polyarticular degenerative arthritis of unknown origin; or secondary when it is usually monoarticular, predisposed by some other disorder/disease or earlier trauma. OA is a common, chronic disease affecting over one third of adults with

the disease prevalence increasing with advancing age. The prevalence of both radiographically defined OA, and of OA related disability, is greater in obese women than in men. It is associated with pain and physical disability and imposes a significant personal, societal and economic burden [03,05]

Contemporary management modalities for knee OA include non pharmacologic, pharmacologic and surgical interventions depending upon severity of disease. A meta-analysis referred by Baker et al, 2007, [01] reports that 60% of OA trials assess drug therapies, and 26% assess surgical procedures.

Management strategies may be regarded as primary prevention [reduction of risk factors to reduce disease incidence], secondary prevention [interventions to slow/prevent progression to serious disease], or tertiary prevention [treatment of pain and disability] [03]

Three main types of non pharmacologic, non surgical biomechanical orthotic interventions are available and recommended by health professionals: shoe insoles, knee braces, and foot orthoses [13]

Material & Methods

The present study was conducted between November 2011 and November 2013 including a minimum follow up of six months. Initially 75 patients diagnosed with knee OA enrolled for the study as per inclusion and exclusion criteria. 44 patients with 84 diseased knees were followed up till end of study. After taking informed consent history was recorded according to protocol, patient was examined and initial WOMAC score calculated. Radiographs were taken and OA graded according to Kellgren & Lawrence classification [06]. After the patient was seen by a consultant s/he was explained about the shoe insole/s required and available. Insoles used in this study were made of microcellular rubber, 10 mm thick full length inserts trimmed according to shape of patient's footwear. S/he was asked to wear the same with footwear and note the duration. S/he was followed up every 2, 4, 6 months and WOMAC score [02] recorded along with relevant findings

Observation, Result and

Analysis

44 patients [30 females (68%) and 14 males (32%), ratio 2.12: 1] were in the age range of 40-76 years, majority (48%) in sixth decade. 4 had unilateral and 40 (91%) with bilateral involvement. 41 left and 43 right knees were affected. Of 44 , 12 were diabetic, 12 obese, 10 had cardiovascular disease and 19 had no co-morbidity. 67% obese patients were female. Of 84 knees, classified according to Kellgren & Lawrence classification, 23 had grade 1 OA , 33 (39%) grade 2, 28 grade 3: grade 4 was excluded. Grade 2 OA was the commonest in both males and females . At the time of presentation and later two third patients took analgesics – NSAID's or opioids . After insole prescription, 5 patients reported an average usage of 2-4 hours/day, 39 (88.6%) used for 4-6 hours /day. Increased compliance to wearing shoe insoles was observed with increasing severity or grade of OA.

The mean WOMAC score at presentation was 39.36 , at 2 months follow up 35.83, at 4 months – 33.17 and at 6 months – 31.15 ($p < 0.0001$). It was statistically significant and indicated significant decrease in mean WOMAC score at successive follow ups

Discussion

Knee OA, a disabling disease, is commonly associated with significant loss of functional independence and impairment in quality of life. Economic impact of OA knee is an ever growing problem for health care systems and professionals in routine practice as well as during disaster management [¹⁰]. Non pharmacologic conservative interventions in the form of orthotics e.g. shoe insoles are gaining world- wide acceptance as first line of approach to management.

Shoe insoles have been commonly prescribed for patients with diabetic foot problems, plantar fasciitis etc. Insoles made of different materials like latex foam, plastazote (polyethylene), cork, dynafoam, orthofelt (cotton and wool), spenco (neoprene sponge), PPT (firm foam), Molo (latex, jel, cork combination) have been studied in depth and compared [^{07,12}]. Historically microcellular rubber footwear had been prescribed for patients with Hansen's disease. Studies evaluating pressure measurement and other aspects are available [⁰⁹]

We report the first time usage of microcellular rubber shoe insoles in knee OA management. WOMAC score was higher in obese patients than in non obese.

WOMAC score rose higher with increasing severity of OA. After microcellular rubber insole utilization WOMAC score decreased in all 3 grades of OA during subsequent follow ups. It indicated relief in pain, improvement in range of motion, activities of daily living and quality of life.

Conclusion

10 mm thick shoe insoles made of microcellular rubber are a promising new orthotic entrant in management of knee OA. By virtue of being simple, safe, easily available, compliant and economic they meet the requirements of an ideal orthotic therapy. They will, hopefully, prove a boon for the patients as well as health care professionals and others in developing countries, especially when required for a large number of patients e.g. during disaster management

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Reviews

Review 1

Review Title: [Review of the article on orthotics in OA knee.](#)

Posted by Mr. Sanjay S Deo on 21 Feb 2014 07:52:27 AM GMT

1	Is the subject of the article within the scope of the subject category?	
2	Are the interpretations / conclusions sound and justified by the data?	
3	Is this a new and original contribution?	
4	Does this paper exemplify an awareness of other research on the topic?	
5	Are structure and length satisfactory?	
6	Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?	
7	Can you suggest any reductions in the paper, or deletions of parts?	
8	Is the quality of the diction satisfactory?	
9	Are the illustrations and tables necessary and acceptable?	
10	Are the references adequate and are they all necessary?	
11	Are the keywords and abstract or summary informative?	

Rating: 5

Comment:

No additional comments.

Competing interests: None

Invited by the author to make a review on this article? : Yes

Experience and credentials in the specific area of science:

I am working as Orthopedic surgeon since last 20 years. The problem of Osteoarthritis in indian population is very common & by just giving shoe inserts in all I dont think we can tackle it effectively.

Publications in the same or a related area of science: No

References:

None

How to cite: Deo S.Review of the article on orthotics in OA knee. [Review of the article 'Microcellular Rubber Insole in Management of Knee Osteoarthritis ' by Prakash J].WebmedCentral Orthopaedics 1970;5(2):WMCRW003008

Review 2

Review Title: Microcellular Rubber Insole in Management of Knee Osteoarthritis

Posted by Dr. Sumit Arora on 17 Feb 2014 08:01:40 AM GMT

1	Is the subject of the article within the scope of the subject category?	
2	Are the interpretations / conclusions sound and justified by the data?	
3	Is this a new and original contribution?	
4	Does this paper exemplify an awareness of other research on the topic?	
5	Are structure and length satisfactory?	
6	Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?	
7	Can you suggest any reductions in the paper, or deletions of parts?	
8	Is the quality of the diction satisfactory?	
9	Are the illustrations and tables necessary and acceptable?	
10	Are the references adequate and are they all necessary?	
11	Are the keywords and abstract or summary informative?	

Rating: 6

Comment:

The study presents the usefulness of microcellular rubber insole for the management of knee osteoarthritis.

It appears to be a good adjunct in the management of knee osteoarthritis. Firm conclusions can not be made as the presented follow-up is only 6 months.

Competing interests: None

Invited by the author to make a review on this article? : Yes

Experience and credentials in the specific area of science:

Yes

Publications in the same or a related area of science: No

References:

None

How to cite: Arora S. Microcellular Rubber Insole in Management of Knee Osteoarthritis [Review of the article 'Microcellular Rubber Insole in Management of Knee Osteoarthritis' by Prakash J]. WebmedCentral Orthopaedics 1970;5(2):WMCRW003006