

# Role of Ultrasound Therapy in treatment of OA knee: A Narrative Review

Vishakha S Patil<sup>1</sup>, Rama Swami<sup>2</sup>

## Abstract

**Purpose:** To summarize the main findings from research (evidence-based) for the role of ultrasound therapy in treatment of OA knee.

**Methods:** A narrative review after studying all the relevant databases known to the authors was conducted.

**Results:** Ultrasound therapy has shown beneficial role in treatment of OA knee. However, when coupled with other interventions, it serves an added impact on improving physical function & quality of life.

**Conclusion:** One should understand that 'lack of evidence' should not be regarded same as an 'evidence of lack'. The context here may be due to lack of one's awareness, or not enough attempts to explore it out or if one hasn't looked beyond their fixed view point, then one may quickly jump to conclusions as it was not adequately explored. Hence conclusion judgement should be avoided based on lack of evidence rather than the presence of it, especially in the field of electrotherapy for the role of ultrasound therapy in the treatment of osteoarthritis knee.

**Key Words:** ultrasound therapy; osteoarthritis; narrative review.

## Introduction

Osteoarthritis of knee is one of the most debilitating diseases which are associated with a large societal & economical burden in addition to the physical & psychological manifestations on the affected individual. There are many ways to diagnose & categorize OA; ranging from subjective assessments to clinical & radiographic investigations whatever the cause, the effect of OA & its impact on functional ability of the individual is something which cannot be ignored. This narrative review article will discuss the role of ultrasound therapy in treatment of osteoarthritis of the knee; while providing an unbiased review of literature available on this topic.

There have been numerous reviews Systemic or otherwise studying the various Physical therapy interventions for patients with Osteoarthritis of the knee [1].

In spite of accumulating research, incongruity exists between the study designs and conclusions drawn from them. This is a narrative review, (however not exhaustive) of the most relevant research available on the topic. However, due to prevalence of unclear

data about efficacy of ultrasound therapy, in the treatment of osteoarthritis of the knee- this review becomes relevant and important. Osteoarthritis is considered to be the most common degenerative disease which affects more than 80% of the population above 55 years [2]. It is a complex, multifaceted condition that has been characterized by various criteria including pathogenesis (mechanical, biological), morphology (articular cartilage, subchondral bone) and clinical features (joint pain, stiffness, tenderness, loss of ROM, crepitus and inflammation/effusion) [3]. This ensemble of clinical and pathologic entities is often referred to as the osteoarthritic complex (OAC).

Ultrasound has been a part of clinical practice since sometime back in the 1950's, and remains a popular and evidenced intervention for a range of clinical problems. Shah and Farrow (2012) [4] provide an insight into its current clinical popularity as does the widely cited paper by Pope et al (1995) [5]. General (textbook) reviews and explanations can be found in Watson and Young (2008) and Robertson et al (2006) amongst others.

Therapeutic Ultrasound has been known to help speed up and improve the quality of tissue healing [6].

Ultrasound is a form of mechanical energy; therapeutic ultrasound ranging between 1-3 MHz. Treatment parameters especially the mode used for treatment continuous or pulsed will result whether thermal or non-thermal results are obtained. One of the highlighting points of therapeutic ultrasound is its role as "pro-inflammatory" rather than "anti-inflammatory" by accelerating the initial inflammatory phase which is essential for tissues to progress to next level of repair [6].

## Methods

Our research included extensive searches performed by independent reviewers over different platforms.

The Cochrane library, MEDLINE, CINAHL, Research Gate, Sport Discus with full text, Scopus, Science Direct and Google scholar databases were searched (1990-2016) to identify the Role of Ultrasound therapy in the treatment of Osteoarthritis of the knee.

In addition internet searches of all relevant arthritis organizations were undertaken. Also Personal & college libraries were searched for texts.

Personal clinical experience & peer discussions were used as influencers in the review process.

A MEDLINE search for scholarly articles using keywords 'ultrasound' and 'Osteoarthritis Knee' resulted in 371 papers.

<sup>1</sup>Assistant Professor, Department of Physiotherapy, LTMMC & GH, Sion, Mumbai

<sup>2</sup>Member Of Physiotherapy Alberta College & Association

## Address of Correspondence

Dr. Vishakha Patil

B-503, LaxmiNarayan Complex, Sector 12A, Plot No

3, Koperkhairne, Navi Mumbai 400706

Email: vishakhaphysio271@gmail.com



Dr. Vishakha Patil (PT)



Dr. Rama Swami (PT)

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A selection criterion was designed to include Randomized control trials, Double blind control trials which compared the therapeutic effects of Ultrasound versus a placebo/ no intervention control group.

### Discussion

The articles reviewed are:

1. Effect of ultrasound on mobility in osteoarthritis of the knee, a randomized clinical trial.

In this study, the effectiveness of ultrasound in relieving stiffness and pain in patients who had osteoarthritis and a chronic knee contracture was carried out. The experimental group (exercise plus US) and control group (exercise plus sham US) both showed significant improvements in active ROM, pain, gait velocity and maintained improvement for at least 2 months. However, no significant differences in knee active ROM or pain was noted, dosage issues being one of the possible explanation for it along with other factors [7].

2. The Effect of Therapeutic Ultrasound on Pain and Physical Function in Patients with Knee Osteoarthritis.

The purpose of this study was to investigate the efficacy of US therapy (n=30) in reducing pain and functional loss and improving the quality of life in patients with Knee OA in comparison to sham US therapy (n=32). The findings of the study concluded that US therapy is effective in reducing pain and

improving physical function in the short term, but this positive effect was not persistent in the long term. Authors also suggested that further systematic investigation on larger patient populations may delineate the role of ultrasound in knee OA treatment [8].

3. Therapeutic ultrasound for osteoarthritis of the knee or hip- A Cochrane Systemic review. The previous summary of this Cochrane review concluded that therapeutic ultrasound had no benefit over fake therapeutic ultrasound in pain relief and functional status. However the updated review of it shows that therapeutic ultrasound may be beneficial for people with osteoarthritis of the knee.

Because of the low quality of the evidence, authors are uncertain about the magnitude of the effects on pain relief and function.

However, Therapeutic ultrasound is widely used for its potential benefits on both knee pain and function, which may be clinically relevant. Appropriately designed trials of adequate power are therefore warranted [9].

4. Efficacy of ultrasound therapy for the management of knee Osteoarthritis: a systematic review with meta-analysis. The purpose of this systematic review study was to assess the efficacy of ultrasound therapy for decreasing pain and improving physical function, patient-perception of disease severity and cartilage repair in people with knee OA. It was concluded that US could be efficacious for decreasing pain and may improve physical function in patients with knee OA. However, researchers have

suggested that the findings of this review should be confirmed using methodologically rigorous and adequately powered clinical trials [10].

5. Use of ultrasound to increase effectiveness of isokinetic exercise for knee osteoarthritis. The objective of the study was to investigate the effects of ultrasound in isokinetic muscle strengthening exercises on functional status of patients with knee OA.

Effectiveness of isokinetic muscle strengthening exercises for treatment of peri-articular soft tissue disorders was compared with and without pulsed and continuous US (n = 120 patients). Authors concluded that US treatment could increase the effectiveness of isokinetic exercise for functional improvement of knee OA, and pulsed ultrasound has a greater effect than continuous US [11].

### Conclusion

Based on all the review of literature, we conclude that:

Ultrasound therapy has proven beneficial effects in the treatment of Osteoarthritis of the knees. However, when coupled with other interventions the impact on improving physical function and quality of life is compounded. This may constitute an important literature base for further evidence-based research and clinical decision-making, incorporating the role of ultrasound therapy in the treatment of osteoarthritis of knee.

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