

## Original Research Article

# Kinesiophobia, fear of fall, neuropathic pain and navicular drop in rheumatoid arthritis- a correlation study

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## ABSTRACT

**Background:** Rheumatoid arthritis (RA) is one of the most common chronic health conditions and a leading cause of pain; joint damage and disability. Fear of fall and kinesiophobia are associated with activity limitations in RA patients because of pain and stiffness which affects the quality of life. Kinesiophobia and fear of fall are associated with pain. The pathogenics and chronicity of RA can lead to neuropathic pain. Hence the aim of this study was to assess pronation of foot and evaluate if there is any correlation between fear of fall, kinesiophobia and neuropathic pain in patients with rheumatoid arthritis.

**Methods:** Subjects in the age group of 30-50 years were included after passing the EULAR criteria and were assessed for navicular drop by using the navicular drop test. Later they were assessed for fear of fall, kinesiophobia and neuropathic pain using fall efficacy scale, Tampa scale and LANSS questionnaire respectively.

**Results:** Significant co-relation was found between kinesiophobia and fear of fall (p value =0.0046) and there were non-significant co-relations between all other factors.

**Conclusions:** Participants with RA showed significant navicular drop where left subtalar joint was more affected than right. According to the LANSS score subjects showed lower concerns of neuropathic pain. Maximum number of subjects displayed high concerns of kinesiophobia and fear fall which proves the significant association between the factors.

**Keywords:** Fear of fall, Kinesiophobia, Navicular drop, Neuropathic pain, Rheumatoid arthritis

## INTRODUCTION

Rheumatoid arthritis ("RA") is one of the most common chronic health conditions and a leading cause of pain, joint damage and disability.<sup>1,2</sup> This leads to lot of limitations in activities of daily living like walking, squatting etc. Fear of fall and kinesiophobia is associated with activity limitations in RA patients because of pain and stiffness which affect the quality of life.<sup>3</sup> Restriction in physical activity affects emotional status of the patients. However little is known about kinesiophobia. There is dearth of literature related to correlation between

kinesiophobia and foot deformities. Kinesiophobia and fear of fall are associated with pain.<sup>4</sup> The pathogenic and chronicity of the disease can lead to neuropathic pain. Neuropathic pain is also associated with sensory disturbances, which causes difficulties in weight bearing activities. Hence the aim of this study was to assess pronation of foot and evaluate if there was any correlation between fear of fall, kinesiophobia and neuropathic pain in patients with rheumatoid arthritis. It can be used as a tool for assessing foot impairment as early assessment could help to improve awareness, prevent further complications and can lead to early interventions.

**METHODS**

Departmental review and Ethics permission was taken for this study. The research was conducted at K. J. Somaiya Hospital of Physiotherapy, Sion. The subjects in the age group of 30 to 50 years and diagnosed with rheumatoid arthritis according to ACR/EULAR criteria were included in the study. A written informed consent was taken from all the subjects. The patients then underwent navicular drop test to evaluate navicular drop and subtalar and midtarsal joint hypermobility with excessive foot pronation (Figure 1).



**Figure 1: Navicular drop in rheumatoid foot.**

The patients were given the Tampa scale for kinesiophobia in the language understood by the patients. Then the patients were given the fear efficacy scale-International scale in the language understood by the patients. The patients were also given the self-assessment questionnaire (S-LANSS) and they were evaluated for allodynia and pin prick threshold. Data was collected and results were analyzed.

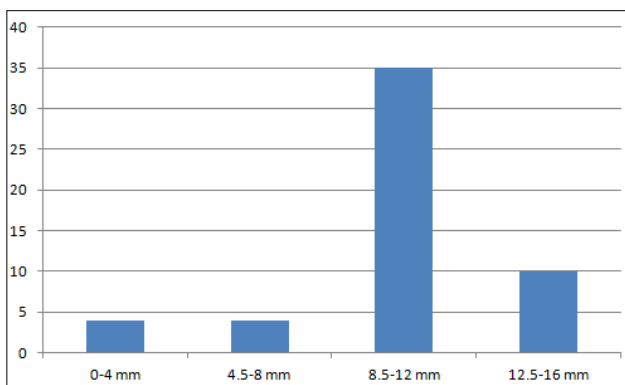
**RESULTS**

The data was entered using MS-Excel 2010 and analysed using Graph Pad Instat 3.1 software. Non-parametric tests were used as data did not pass test of normality. P value less than 0.05 were considered statistically significant and 95% confidence interval. Spearman’s correlation tests were used find co-relation between the factors. The results are summarized in Table 1.

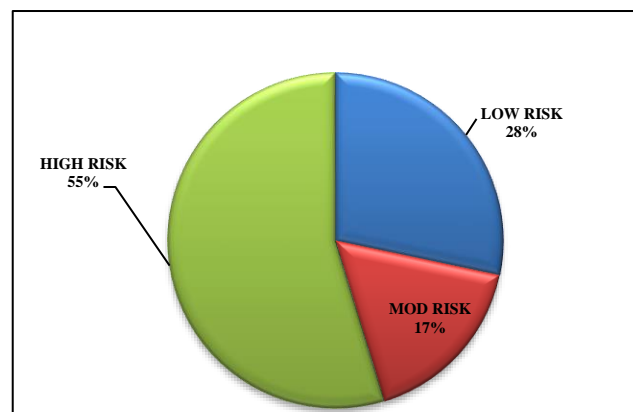
Significant co-relation between kinesiophobia and fear of fall and non- significant co-relations between kinesiophobia and neuropathic pain, kinesiophobia and right navicular drop, kinesiophobia and left navicular drop, fear of fall and neuropathic pain, fear of fall and right navicular drop, fear of fall and left navicular drop, neuropathic pain and right navicular drop, neuropathic pain and left navicular drop.

**Table 1: Summary of statistical analysis.**

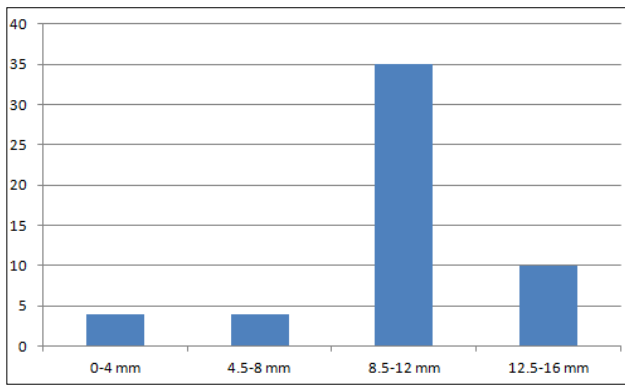
	R co.	P value	Significance
<b>Kinesiophobia and fear of fall</b>	0.3832	0.0046	Significant
<b>Kinesiophobia and neuropathic pain</b>	0.2328	0.0934	Non-significant
<b>Kinesiophobia and right navicular drop</b>	0.2351	0.0902	Non-significant
<b>Kinesiophobia and left navicular drop</b>	0.1419	0.3109	Non-significant
<b>Fear of fall and neuropathic pain</b>	-0.08927	0.5250	Non-significant
<b>Fear of fall and right navicular drop</b>	0.09059	0.5188	Non-significant
<b>Fear of fall and left navicular drop</b>	0.07681	0.5846	Non-significant
<b>Neuropathic pain and right navicular drop</b>	0.2346	0.0909	Non-significant
<b>Neuropathic pain and left navicular drop</b>	-0.04575	0.7450	Non-significant



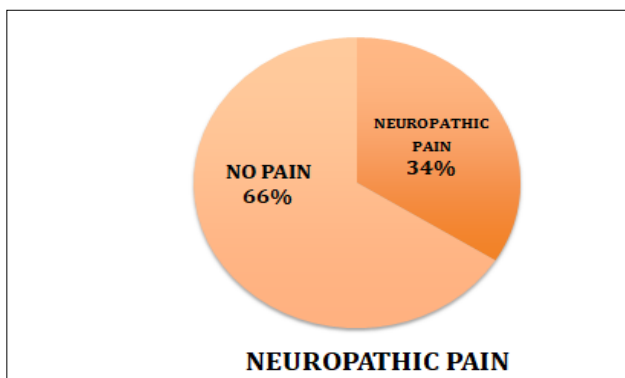
**Figure 2: Bar diagram representing distribution of patients having kinesiophobia.**



**Figure 3: Fear of fall distribution in pie chart.**



**Figure 4: Bar diagram representing distribution of patients having navicular drop.**



**Figure 5: Neuropathic pain distribution in pie chart.**

## DISCUSSION

Rheumatoid arthritis (RA) is a long term autoimmune disorder that primarily affects joints of upper limb and lower limb. It usually results in warm, swollen, and painful joints.<sup>5</sup>

The exact cause of rheumatoid arthritis is not known but it is believed to involve a combination of genetic and environmental factors.<sup>6</sup> As it is an autoimmune disorder the mechanism involves the body's immune system attacking the joints.

As a result of this mechanism there is inflammation and thickening of the joint capsule which affects the underlying bone and cartilages as well. As published by Kanai et al the pathophysiology of rheumatoid arthritis (RA) is characterized by excess production of pro-inflammatory cytokines, including tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-1 $\beta$  (IL-1 $\beta$ ), and interleukin-6 (IL-6) by neutrophils and macrophages in synovium.<sup>13</sup> Also, these cytokines promote the production of reactive oxygen species (ROS), and increased production of matrix metalloproteinases (MMPs), including MMP-3, in synoviocytes that result in joint destruction.

After the hand, the foot was the most commonly symptomatic joint complex at the start of the disease, but

also during active medical treatment. 90% of people with established rheumatoid arthritis report foot problems at initial diagnosis.<sup>7</sup> Forefoot is most commonly affected part of the foot after hind foot and ankle joint.<sup>8</sup> The present study was undertaken to assess the correlation between kinesiophobia, fear of fall, neuropathic pain and navicular drop in subjects suffering from rheumatoid arthritis. The study was conducted after screening 53 patients according to the inclusion and exclusion criteria within the age group of 30 to 50 years where the mean age group was  $42.7 \pm 5.14$  years. RA could start at any age but the disease is prevalent in the third to fifth decades of life.<sup>5</sup> 74% in this study were females and 26% were males. World health survey estimates give a female prevalence of disability nearly 60% higher than that for males.<sup>9</sup> Kinesiophobia and fear of fall showed statistically significant positive correlation with a p value of 0.0046. Higher the score greater the kinesiophobia; in this study 28 among 53 subjects showed highest amount of kinesiophobia with an average score of 31.4 (Figure 2). Also, according to Figure 3, 55% of subjects showed highest risk of falls, 17% showed moderate risk and 28% showed low risk of fall. Guhler et al and Mikos et al stated that RA patients with foot pain/deformities have a higher risk of fall.<sup>14,15</sup> Armstrong et al found occurrence and risk factors for falls in rheumatoid arthritis.<sup>16</sup> Falls were significantly associated with self-reported impairment in lower limb function.

The probable causes for above results are foot impairment and disability, co morbid conditions, history of a previous fall, fatigue and dizziness, anti-depressants and antihypertensive, swollen and tender joints decreased lower extremity muscle strength, impaired standing balance.<sup>10-12</sup>

## CONCLUSION

The results of the study showed that kinesiophobia can be an important factor related to fear of falling in patients with rheumatoid arthritis. The study stated that maximum number of patients had high risk of fear of fall and kinesiophobia. Hence it should be addressed during the treatment as it might influence the treatment outcome and also prognosis and might help in improving the quality of life of the patients. Findings of our study also suggested that navicular drop is commonly seen in patients with rheumatoid arthritis (Figure 4), hence correcting and maintaining the foot alignment should be considered. Participants with rheumatoid arthritis showed lower concerns of neuropathic pain according to the LANSS score (Figure 5). Hence we can conclude from this study that there was significant co-relation between kinesiophobia and fear of fall and non-significant correlations between kinesiophobia and neuropathic pain, kinesiophobia and right navicular drop, kinesiophobia and left navicular drop, fear of fall and neuropathic pain, fear of fall and right navicular drop, fear of fall and left navicular drop, neuropathic pain and right navicular drop, neuropathic pain and left navicular drop.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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