Brief Communication

Effect of cold weather on patients with orthopedic implants

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Abstract

Objective: We conducted this study to examine the prevalence of pain in patients with orthopedic implants, placed to stabilize a fracture or for arthroplasty, when exposed to cold weather in the Saudi Arabia

Methods: We asked 100 patients with orthopedic implants to complete a pretested questionnaire. These patients visited the Orthopedic Clinic at King Fahad Medical City, Saudi Arabia, for follow-up.

Results: Of 100 patients, 49 (49%) experienced pain from implants related to cold temperatures (8\(^\circ\)C–10 \(^\circ\)C) during winter. The remaining 51 patients (51%) did not experience pain due to cold weather.

Conclusion: The current study showed a statistically significant relationship between cold weather and pain in patients with implanted orthopedic hardware.

Keywords: Arthroplasty; Cold weather; Fracture; Orthopedic implants; Pain

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Introduction

Fractures and degenerative joint diseases are common medical problems that many individuals experience during their lifetime. Orthopedic implants are widely manufactured and used throughout the world to replace a diseased joint or support a broken bone. In our practice, we noticed that many patients complained about their implants when they were exposed to cold temperatures during winter. Patients have stated that their pain was due to the implant and have requested surgeons to remove the implant in order to relieve their pain. We aimed to understand the prevalence and severity of the pain experienced by these patients when exposed to cold temperatures.

To achieve this aim, we assessed how frequently patients with orthopedic implants felt pain related to the cold and whether there were any significant relationships between this type of pain and age, sex, or occupational status of the patient; type or site of implant; and the time since the surgery was performed. We also assessed the severity of any pain and the effect of cold in an air-conditioned environment. Furthermore, depending on our results, we intend to try to find the reason behind any effect of cold on these patients in the future.

Materials and Methods

Over an 11-month-period, 100 consecutive patients with orthopedic implants who were followed up at the Orthopedic Department in King Fahad Medical City, Riyadh, KSA, were included in this study. Our Institutional Review Board approved the study protocol, and patient confidentiality was maintained throughout the study. Patient interviews were conducted using a pretested questionnaire. The sampling technique used in this study was purposive and convenience sampling.
We excluded patients who had surgeries within the previous 3 months and patients with any signs of infection or complication. Additionally, we excluded patients with absorbable implants. Furthermore, patients 14 years of age were excluded as their responses may not be reliable.

Patients were divided into two groups according to pain severity: group 1, patients who rated their pain from 1 to 4 (less significant pain), and group 2, patients who rated their pain from 5 to 10 (more significant pain) on a numeric rating scale.

Results

Of the 100 patients with orthopedic implants included in this study, 56 (56%) were male and 44 (44%) were female; 50 (50%) were employed, 29 (29%) were unemployed, and 21 (21%) were students. Plates were the most common implant used in 32 patients (32%), whereas joints were the most frequent sites of the implants in 31 patients (31%). The greatest proportion of our participants (31%) had their orthopedic implant surgery within the past 12–36 months; however, 30 patients (30%) had their surgery >36 months before the study (Figures 1–3).

We found that 49 patients (49%) experienced pain after their implant surgery related to cold temperatures, but 51 patients (51%) did not. In terms of pain severity, the total number of 29 patients (29%) reported significant pain (group 2), accounting for 59.2% of the patients who felt pain (Figure 4).

We found no significant relationship between pain upon exposure to cold temperatures and patient age ($p = 0.913$), sex ($p = 0.562$), occupational status ($p = 0.552$), type of implant ($p = 0.557$), site of implant ($p = 0.645$), or time since surgery ($p = 0.822$).

Forty-six patients (46%) mentioned that they experienced pain when exposed to cold in an air-conditioned environment, and 45 of these patients reported that they generally experienced pain during cold weather conditions, whereas one of these patients did not experience pain related to cold weather.

Comparisons of pain severity with our study parameters revealed no significant relationship between pain severity and patient age ($p = 0.687$), sex ($p = 0.348$), occupational status ($p = 0.997$), type of implant ($p = 0.874$), site of implant ($p = 0.666$), time from surgery ($p = 0.762$), and cold from air-conditioning ($p = 0.147$).

![Figure 1: Frequency of implant types.](image1)

![Figure 2: Frequency of implant sites.](image2)
Discussion

In our literature review, we did not find any study discussing the effects of cold temperatures on patients with orthopedic implants, although we frequently receive complaints from our patients about pain in cold weather. We believe this is a common problem encountered in our practice, and our results emphasize how common this problem is, with 49% of our participants reporting feeling pain related to cold conditions. Therefore, this should draw attention to the importance of this study. We selected our inclusion and exclusion criteria to ensure that our results would be meticulous and focused on our primary objective.

A study of 83 cases looking at the indications for implant removal found that pain and implant prominence (mechanical symptoms) were the most common indications, but there was no mention of cold weather as a cause of pain.

Another study on the impact of psychological factors on implant removal surgery showed that mental and psychological factors could affect the severity of discomfort caused by the implant. Although our study did not directly address the psychological aspect, we clearly showed that occupational status, age, and sex did not affect the feeling of pain related to cold weather conditions or even the pain severity in people who have this type of pain.

A prospective study that evaluated pain reduction following removal of implants after fracture union discussed whether the superficial implant caused greater problems. They cited many studies that revealed that deep implants also cause pain and that there was a high percentage of patients who experienced pain relief after removal. Furthermore, they mentioned that “one may intuitively assume that superficial implants present a greater problem with regard to symptoms; however, that does not seem to be borne out in the literature.” This is in accord with our results showing that the pain caused by cold temperatures was not related to the anatomic location of the implant.

A study by Onche et al. stated that “patients with peri-implant pain, experienced relief from intractable pain following their operations. No intra-operative feature could explain their symptoms.” This should raise the suspicion that cold weather may be the cause of these unexplained symptoms.

As sample size may be considered a limitation in our study, we recommend further research using a larger sample size in the future. We believe this will provide more reliable results, mainly because of the many different orthopedic implants and anatomical sites of implants. Furthermore, as
we conducted our study in a relatively warm country (KSA), it would be interesting to find another study conducted in a colder country.

**Conclusion**

Cold temperatures may cause pain in a significant number of patients with orthopedic implants. A high proportion of these patients have significant pain (5–10 on a numeric rating scale) related to cold conditions. However, we found no relationship between feeling pain or pain severity triggered by cold temperatures and patient age, sex, occupational status, type of implant, site of implant, or the time since surgery.

Cold air from an air conditioner seems to play a significant role in causing pain in patients with orthopedic implants.

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**Conflict of interest**

The authors have no conflict of interest to declare.

**Ethical approval**

Ethical approval for the study was obtained from the Institutional Review Board at King Fahad Medical City, Riyadh, KSA (IRB log number: 17–241).

**Authors contributions**

JTA conceived and designed the study, collected and organized data, and prepared the initial and final drafts of the manuscript. TMA suggested the main idea, assisted in collecting the data, critically revised the manuscript, and prepared the Arabic abstract. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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