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REVIEW ARTICLE

# Developing an evidence-based nursing protocol on wound drain management for total joint arthroplasty

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**KEYWORDS**
Wound drain;
Management;
Total joint arthroplasty;
Clamping;
Drain removal;
Application;
Systematic review

**Abstract** ***Background:*** Although various drains have long been used for many years in total joint replacement, there is a paucity of evidence for the benefit of drain applications. Evidence suggests inconsistent practice in the use of drainage systems, whether intermittently applying suction or free of suction in the application of drainage systems, as well as the optimal timing for wound drain removal.

***Aim:*** It aimed to perform a systematic review to develop an evidence-based nursing protocol to manage wound drainage following total joint arthroplasty.

***Methods:*** A comprehensive systematic review of available evidence up to 2013. Searches of the EMBASE, Cochrane library, CINAHL, Medline electronic databases and an internet search by Yahoo and Google engine returned 2840 records, of which 11 met the inclusion criteria for this review. A further two papers were obtained through scanning the reference lists of those articles included from the initial literature search.

***Results:*** Different clamping times were retrieved from the literature. A protocol was adapted for clinical application according to the summary of the retrieved information. It is suggested that clamping is performed 1 h after the insertion of suction drains post-operatively in the operating theatre. Wound drains should be clamped for 1 h if blood loss is more than 600 ml in 6 h in first 24 h. Wound drains should be clamped for 1 h if blood loss is more than 800 ml in 8 h thereafter. It is suggested that the drainage reservoir bottle should be mark and findings recorded in line with the principle of drain clamping. This means that the amount of drainage is measured and recorded every 6 h in first 24 h and every 8 h thereafter. It is suggested that wound drains should be remove before 48 h after TJR. If blood loss is less than 50 ml in past 6 h or less than 70 ml in past 8 h, the drain should be remove and the wound site should be monitored closely.

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***Conclusion:*** This paper has guided nurses to develop an evidence-based protocol to improve patient care on wound drain management. Further study is necessary to evaluate the effectiveness of the protocol.


**Contents**



## Background

Orthopaedic drains are often used after major operations such as anterior spinal fusion with laminectomy, total joint arthroplasty and anterior cruciate ligament reconstruction. Uses include fluid collection, prophylactic prevention of fluid accumulation, acceleration of the healing process, promotion of tissue approximation, minimisation of the risk of infection and reduction of postoperative pain (Schein, 2008). As a diagnostic tool, drains can facilitate monitoring of early signs of leakage from anastomoses (Diener et al., 2011). Traditionally, drains have been used to remove blood, air or discharge for decompression, elimination of dead space and/or elimination of haematoma formation (Fan et al., 2006; Kanayama et al., 2010). This is because postoperative haematomas and wound infection can have neurological consequences in spinal procedures (Morse et al., 2007), and cause compartment syndrome in arthroplasty-related procedures (Niskanen et al., 2000). However, prolonged drainage may lead to complications with wound conditioning.

Although drains have been used for many years, there is a paucity of evidence regarding the benefits of drain application. As a result, the benefits and drawbacks of wound drainage following orthopaedic procedures is the subject of debate (Parker et al., 2004).

The management of drainage systems with and without clamping is another subject of debate. In the Department of Orthopaedics and Traumatology, United Christian Hospital, Hong Kong, surgeons often order passive drainage ('free drainage') if too much blood is lost in the drainage bottle with suction. Bleeding control is of major importance in total knee arthroplasty (TKA) during the first few postoperative hours as most blood loss occurs during this period (Senthil et al., 2005). However, the decision to use drainage with suction is based on the surgeon's judgment of the amount of blood in the drainage bottle. Frontline nurses hesitate to identify what principles or evidence support such acts, and the exact amount of blood loss from a drain that should be of concern hence influencing passive drainage and removal of drain. Practice is inconsistent in terms of using a drainage system, applying intermittent suction or no suction (passive drainage), as well as the optimal time for wound drain removal. Therefore, three main questions were posed in this systematic review:

1. What decisions does a surgeon need to consider in using wound drain application?