

Enhanced Management of Orthopaedic Surgery

A case study in innovation

Clinical Innovation Program



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Section 1

Purpose

This document outlines a case study, the Enhanced Management of Orthopaedic Surgery (EMOS) program at Coffs Harbour Health Campus (CHHC).

This project incorporates some aspects of two well-established models of care that have been associated with improved patient outcomes:

- the NSW Model of Care for the [Osteoarthritis Chronic Care Program \(OACCP\)](#)
- the NSW Model of Care for [Enhanced Recovery After Surgery \(ERAS\)](#).

Further details of these two models of care are available on the ACI website. This document highlights how aspects of these models can be used to achieve a model to meet the needs of a local site. This document does not provide specific details on the two models, but rather describes how they can be aligned to work together. This case study, together with the *ACI Implementation Guide*¹ can support the process of improvement in the management of orthopaedic services at a local site.

Section 2

Introduction

In 2011, patients at CHHC were waiting approximately 12 months for their total knee and hip replacement surgery. Patients often presented with multiple comorbidities (such as obesity, hypertension and type 2 diabetes), which affected their readiness for surgery. In response to an increasing waitlist for a complex cohort of patients, EMOS was developed to improve patient care and improve access to surgery for patients (Figure 1).²

The incidence of orthopaedic surgery for knee and hip is on the rise, associated with increases in osteoarthritis with an ageing population.⁶ Evidence-based hip and knee osteoarthritis care involves a team of healthcare practitioners working together to maximise a patient's health and function, manage comorbidities, minimise disability and support timely access to surgery.

Since 2013, EMOS has focused on enhancing the recovery of patients after surgery, increasing early mobilisation, reducing patients' length of stay, and reducing complications (Figure 2). The model was implemented for total hip replacements (THR) and total knee replacements (TKR).

It has achieved outcomes through changes in: clinical interventions, administration, treatment protocols, surgical bookings procedures, waitlist systems and recall and reminder systems. This has been possible due to the support and engagement of a committed, motivated and well-supported team. The program is now implemented and considered business as usual.

THE CHALLENGE



Figure 1. EMOS: the case for change

The EMOS program spans the patient journey for joint replacement, from initial contact to 48 hours after discharge. The EMOS program incorporates elements from a number of ACI models of care and frameworks, literature reviews and international evidence-based practice models, translating them into practice changes that can be implemented at a local level.

This approach brings together components of early management of osteoarthritis with surgical management and post-operative care. For example, the EMOS approach refers to the *Model of Care for the Osteoarthritis Chronic Care Program*,³ the *Model of Care for Enhanced recovery after surgery model of care*, the *NSW evidence review: Preoperative, perioperative and postoperative care of elective primary total hip and knee replacement*,⁴ surgical antibiotic prophylaxis (as per local health district policy or guidelines) and the *Pre-procedure preparation toolkit*.⁵

Enhanced Management of Orthopaedic Surgery (EMOS)

GOAL:

Provision of evidence based care to identified orthopaedic patients by utilising an holistic approach; from receipt of request for admission through admission for surgery and acute hospital stay and to post-discharge follow up from Coffs Harbour Health Campus.

OBJECTIVES:

1. Establish a pre-operative program to ensure 100% of people undergoing elective hip and knee replacement surgery will be assessed by multidisciplinary team using the central tenets of a chronic disease program, that is, goal setting and supported disease self-management
2. Improve physical function, strength and pain pre-operatively of elective hip and knee replacement patients through attendance of 'prehabilitation' program
3. Improve management of patients' comorbidities pre-operatively through primary care practitioners
4. A detailed pre-operative and post-operative management plan, in conjunction with the person and the health care team, will be developed for 100% of people undergoing elective surgery. Reduce proportion of patients cancelled on the day of surgery to less than 5% within 12 months
5. Improve efficiencies related to joint replacement processes
6. Reduce re-admission within 90 days after discharge from elective hip and knee replacement surgery to less than 1%. The key performance indicator for NSW is 2%.

Figure 2. The goals and objectives of EMOS

Section 3

Enhanced Management of Orthopaedic Surgery (EMOS)

There are three different pathways for patients with osteoarthritis in CHHC, influenced by patient need, level of acuity, area of residence and their ability to actively engage in their own care.

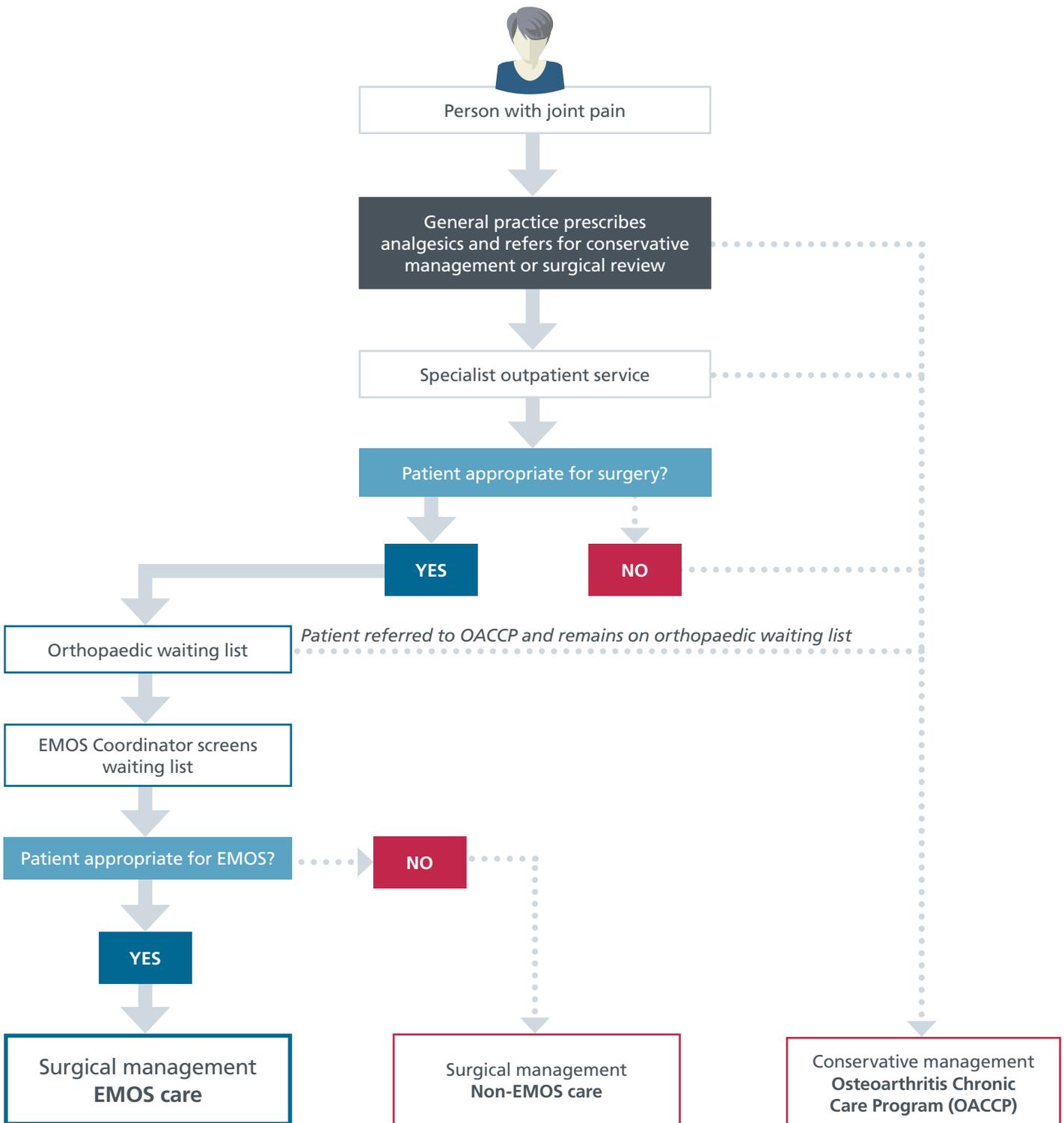


Figure 3. Available pathways for people with osteoarthritis in Coffs Harbour Health Campus

This case study specifically highlights the EMOS pathway.

The EMOS program is part of a chronic care approach. At its core, it considers the patient as well as the person, who is an individual capable of effectively managing their own health and actively participating in decision-making about their own care. This translates into greater patient engagement and truly patient-centred care, where the patient is encouraged to maintain their usual activities of daily living (for example, walking independently). It reinforces that orthopaedic surgery is just one event within their journey as a person with a chronic condition.

The EMOS approach is divided into four stages: preoperative, perioperative, post-operative and post-discharge. The stages and elements of care are shown in Figure 4 and are further explained. The complexity of the pathway, and the number of people involved, requires organisational processes, protocols and tools to ensure smooth and continuous care for the patient throughout each of the stages and elements of care.

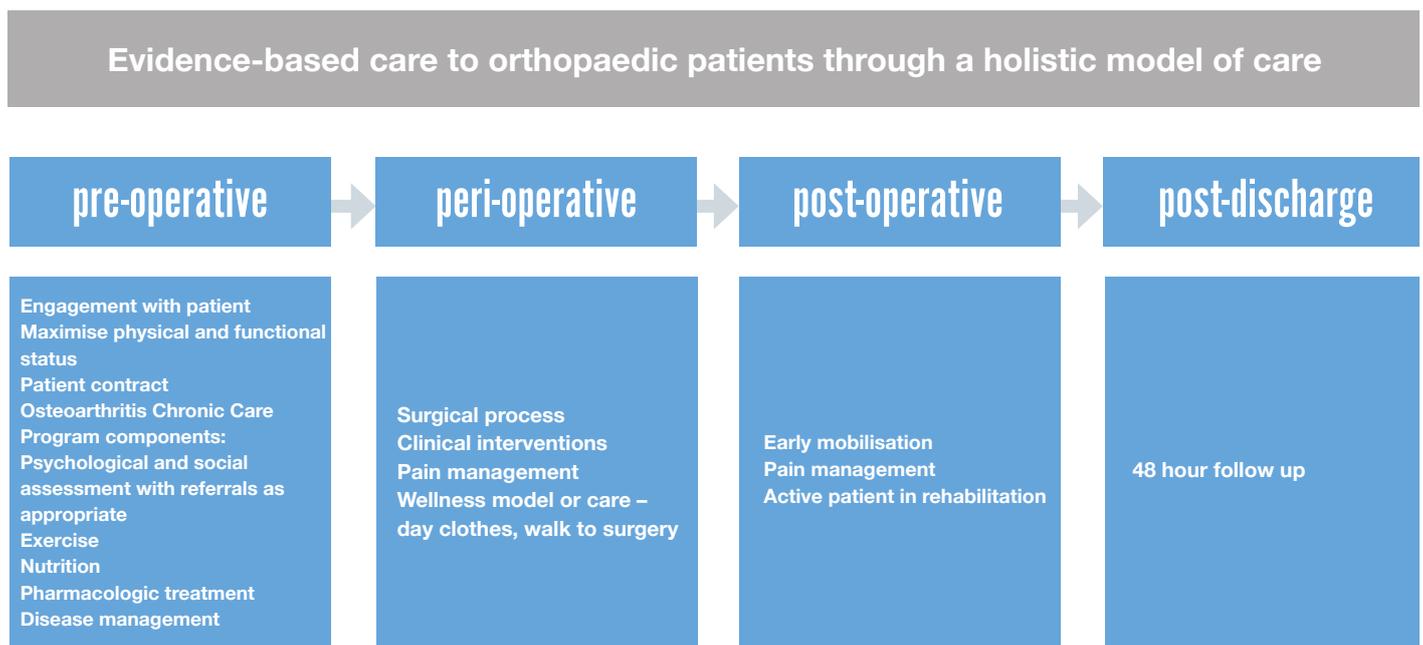
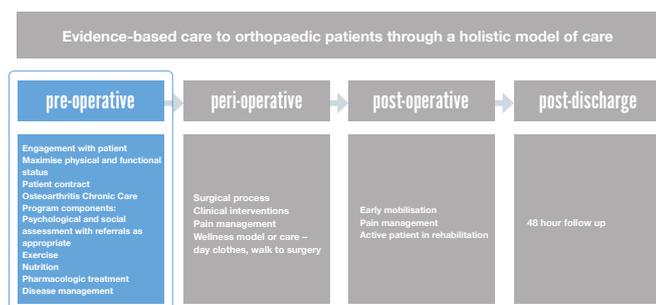


Figure 4. EMOS stages and elements of care



2. To ensure patients are ready for surgery

Admission staff ensure the patient's comorbidities are reviewed and managed, so that the patient is physically suitable for surgery. To reduce any unnecessary delays or deferrals of surgery, this review occurs while the patient is on the waiting list. Clinical information and medications are also prepared at this stage.

The EMOS program is underpinned by an active-patient philosophy, which considers patients undergoing elective joint replacements to be well and healthy. As a result, patients are expected to actively engage in decision-making, and to participate in their care and rehabilitation as they would in their other daily routines and activities. This engagement and participation by patients is reflected in the use of an EMOS contract, which outlines patients' responsibilities on the EMOS pathway.

Patient engagement begins with their identification. The physiotherapist reviews the surgical waiting list each week and identifies suitable candidates for EMOS. Patients can also be identified by their local GP, who will refer the patient to the EMOS program (Figure 5). In this process, the only exclusion criterion is a patient's place of residence, due to limited resources for treating patients from outside Coffs Harbour.⁹ Following a comprehensive assessment, the physiotherapist ensures the patient is suitable for the EMOS pathway, and obtains the patient's agreement and signature on the EMOS contract.

Pre-operative care

The EMOS pathway begins with the pre-operative stage. This involves engaging with patients in the community: those linked with primary healthcare (or general practice) or physio-led exercise sessions and those on waiting lists within our healthcare system.

The preoperative stage of EMOS has two primary aims:

1. To maximise the health of patients prior to surgery

Evidence supports conservative management of osteoarthritis, with conservative interventions slowing disease progression, reducing pain and minimising disability.⁷

The NSW Model of Care for the [Osteoarthritis Chronic Care Program \(OACCP\)](#)⁸ focuses on early, accessible, conservative management of osteoarthritis, using a patient-centred approach. The program is underpinned by an approach to managing chronic disease that involves: supporting self-management through health coaching, involving a multidisciplinary team (including psychological and social assessment), educating about disease management, coordinated care planning (including preparation for the inpatient stay) and taking measures for successful discharge.

Implementing the OACCP has significantly improved clinical outcomes (such as pain, mobility and function) for patients with osteoarthritis of the knee, and less so for patients with osteoarthritis of the hip.⁹ Importantly, a proportion of patients in the OACCP (11% of those waiting for knee replacements, 4% of those waiting for hip replacements) were removed from surgical waitlists because they no longer required surgery.¹⁰

EMOS uses this program as a foundation to maximise the engagement and health of patients while on the surgical waiting list.

^a There is limited or no access to OACCP, a key part of the EMOS pathway, in rural areas surrounding CHHC. Coffs Harbour Health Campus is currently planning expansion of the program to rural sites.

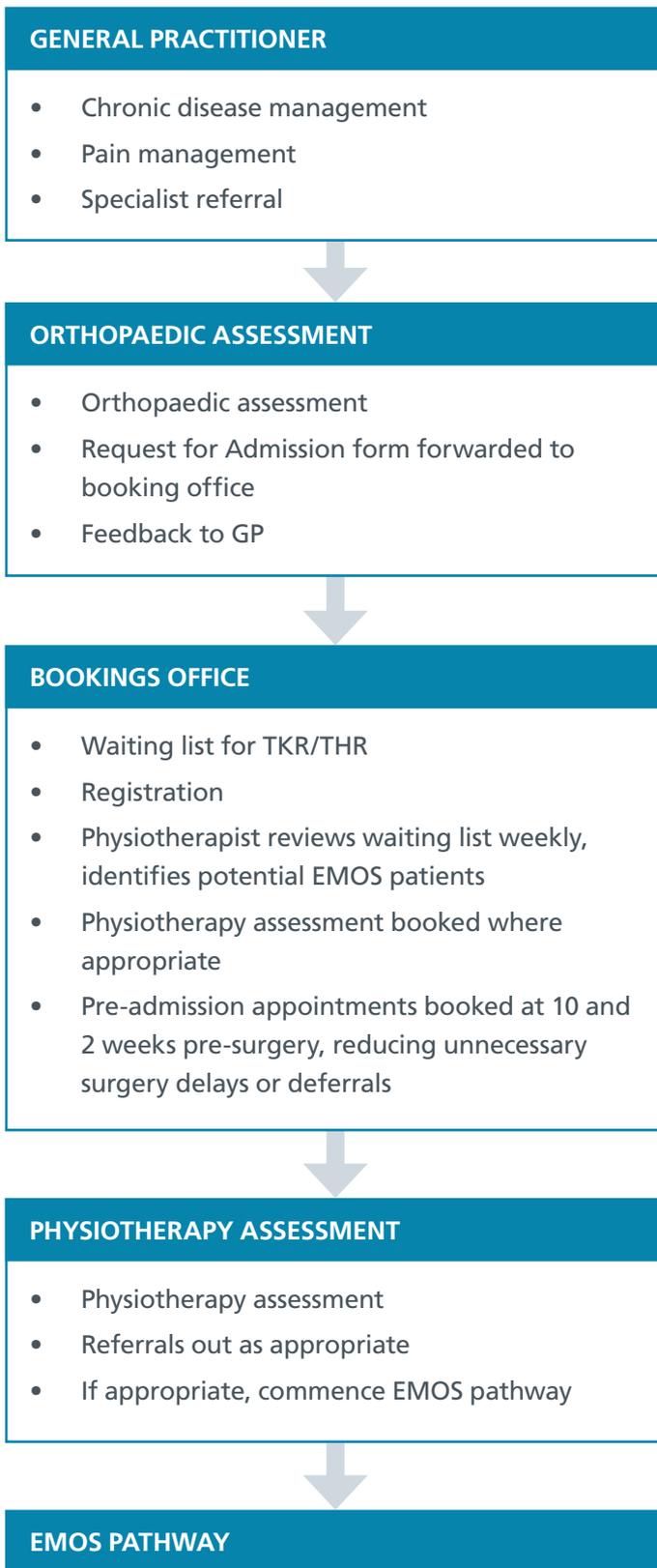
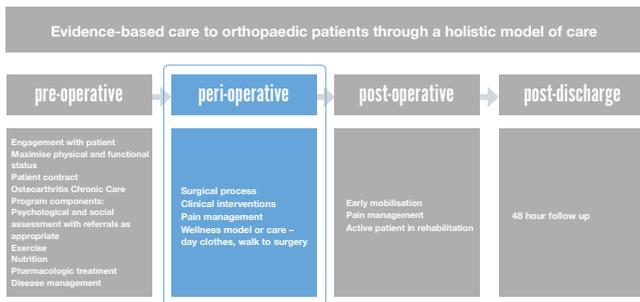


Figure 5: From GP referral to EMOS pathway



Peri-operative care

The perioperative components of EMOS are well planned and coordinated across clinical and support staff. They build on pre-operative strategies to minimise surgical stress, which include pre-medication, high-protein carbohydrate drinks, spinal anaesthesia and tranexamic acid. These aspects of care are all described on the EMOS pathway. One of the key differences between standard care and this stage of EMOS, is the use of spinal anaesthesia, rather than general anaesthesia, in surgery.

The peri-operative stage of EMOS has three key aspects:

1. Preparation allowing for surgery early in the day

The CHHC theatre schedule is designed so EMOS patient surgeries take place early in the day. This reduces fasting time and lets patients mobilise on the same day. Pre-operative work (before the day of surgery) makes this possible; ensuring access to required medications, preparing the patient for surgery and minimising delays and deferrals.

2. Spinal anaesthesia

A body of evidence supports the use of low-dose spinal anaesthesia in joint-replacement surgeries. Spinal and regional anaesthesia are commonly used in international Enhanced Recovery After Surgery pathways of care.¹¹

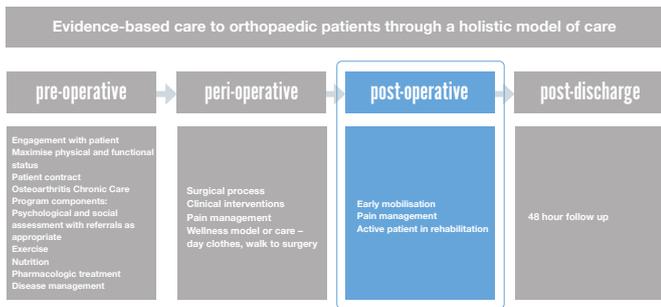
For TKR surgeries, the use of spinal or neuraxial anaesthesia has been associated with a reduction in complications (compared with use of general anaesthesia). Additionally, it has been associated with reduced rates of pneumonia and infections within 20 days of surgery, and lower rates of blood transfusion.^{12,13,14}

For THR surgeries, the use of spinal anaesthesia has been associated with fewer adverse events and reduced operating times and decreased mortality within 10 days of surgery¹⁶ compared with the use of general anaesthesia.

Some patients may be unsure about being 'awake' for their surgery. In theatre, CHHC EMOS patients have access to sedation, noise-cancelling headphones, DVDs, CDs and iPods.

3. Carbohydrate drinks

Carbohydrate drinks are used as a peri-operative element to minimise the effects of fasting.



Post-operative care

The primary aim of the post-operative care stage of EMOS is to minimise post-surgical complications through optimal pain management of all patients and early mobilisation of patients who are not contraindicated. Achieving this hinges on a carefully planned perioperative phase and the active participation of the patient in their care and recovery.

The post-operative stage of EMOS has two key aspects:

1. Pain management

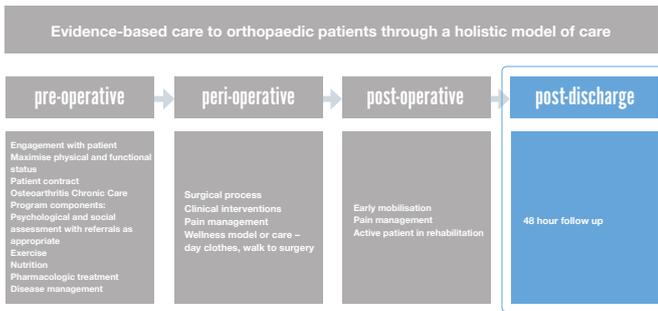
Successful, multimodal pain management is central to a patient's early mobilisation. The EMOS pathway aims to manage post-operative pain in a variety of ways, including spinal anaesthesia (this is delivered peri-operatively but has lasting effects on the patient's pain levels after surgery has finished) and local wound infiltration. The clinical team aims for pain to be managed at a level of three to four out of ten on a pain-assessment scale.

Variation still exists within the CHHC in the use of post-surgical analgesia. Opportunities to increase consistency across anaesthetists and surgeons are expected to be explored in the next phase of the program.

2. Early mobilisation

The EMOS program aims to have every patient mobilising within seven hours of surgery to reduce complications. In this instance, mobilisation is defined as weight-bearing movement, with patients walking up to six metres. Early mobilisation is 'normalised' by co-locating EMOS patients in shared rooms on the ward and through the layout of the ward and the integration of day-to-day clothing and footwear within rehabilitation plans. Nursing staff discuss the process of mobilisation with the patient from the time they are admitted to the ward. The patient and the environment are simultaneously prepared to let this occur. Patients are expected to mobilise on the day of their surgery. The physiotherapist will observe and assist patients to mobilise and the nursing staff play a vital supporting role.

Medical stability is the primary requirement for early mobilisation. Mobilisation is delayed if a patient is medically unstable or presents with any contraindications. Pain is not an acceptable cause for delay of weight-bearing and/or mobilisation. It is expected that pain can be managed to allow mobilisation and that this continues over the duration of the stay.



Post-discharge and transfer-of-care follow-up

The post-discharge stage of EMOS requires that all patients are contacted by telephone within 48 hours of discharge. This is to confirm that patients have understood post-discharge instructions, that a follow-up appointment has been scheduled and that the patient is mobilising as per the protocol. The 48-hour follow-up also provides an opportunity to confirm that the patient knows the appropriate person to contact if they have concerns, and how to do so.

Section 4

EMOS program outcomes

Following an examination of current processes and outcomes for joint replacement surgeries at CHHC, the project team developed, designed and implemented new clinical pathways and supporting tools. The EMOS program approach to management of orthopaedic patients was implemented for THR and TKR at Coffs Harbour Health Campus in late 2013. EMOS elements are now being implemented and considered usual business.

OUTCOMES



Implementation of EMOS was seen to reduce:

- patient length of stay by 32%
- waiting lists (and patients no longer requiring surgery)
- surgical cancellations
- post-surgical complications by 1% ¹⁷
- post-surgical readmissions by 4% ¹⁷
- the rate of transfer to inpatient rehabilitation by 46%.

Post-surgical complications often arise from delayed mobilisation of patients. In 2015, the CHHC achieved mobilisation in fewer than seven hours for 48% of EMOS THR/TKR patients.¹⁸ This was achieved through:

- surgery early in the day
- multimodal pain relief
- active patient engagement in rehabilitation
- early-discharge planning.

Anecdotally, prior to the EMOS development and implementation at CHHC, patients would often re-present to the Emergency Department with pain in the days post-discharge. The EMOS program addresses this by extending the length of the care episode to 48 hours after discharge.

Since implementing post-discharge follow-up, there have been fewer readmissions or repeat presentations. EMOS patients have fewer readmissions than non-EMOS patients over the first 90 days after surgery.¹⁸

Section 5

Lessons for implementation

The team at CHHC worked for a number of years to develop an approach to care which reduces complications from orthopaedic joint surgery, improves recovery times and reduces healthcare costs.

Implementing EMOS required rigorous project management, outlining clear governance structures and aims and objectives early in the process. While supported by the ACI Clinical Redesign School, the team involved in the design and implementation of this project were enthusiastic and passionate about working together to improve their patients' outcomes. The team's and the clinical environment's readiness for change facilitated the successful implementation of this project.

The project was undertaken using ACI's process for implementing a change, and involved a diagnostic stage before identifying and designing solutions, implementing these solutions and making them sustainable.

The following aspects of implementation have been highlighted by the CHHC team as key to their success:



project leadership
and governance



prepared team
clear roles and responsibilities,
education and training



tools
protocols, clinical pathway,
recall and reminder systems



patient centred
approach



monitoring and evaluation
outcome and process measurement

- **Project leadership and governance**

Executive and senior management support must be identified at the start of the project. This support is critical to the success of a project, provides leadership to those managing the project, and enables effective decision-making processes and control systems.

- **Prepared team**

The project team, who will design and implement change and who include clinical and non-clinical team members, should demonstrate a readiness for change for improvement. The team should include people from numerous roles and levels within the organisation with clear lines of accountability and roles and responsibilities.

- **Tools**

The EMOS pathway (Figure 3) and supporting tools provide structure and facilitate the change in practice.

- **Patient centred approach**

The engagement of the patient is central to the success of this program, with patients informed about what to expect and motivated to mobilise early.

- **Monitoring**

Opportunities remain to further improve orthopaedic joint replacements. The EMOS team is currently examining opportunities to collect more data on patient experience and outcomes.

Section 6

Focus for the future

While EMOS has been implemented successfully, certain areas require continued focus, including:

- developing **greater consistency and consensus** between specialists and anaesthetists on the best anaesthetic and analgesic options for patients
- **engaging patients** more closely in the evaluation and design of future systems of care
- capturing a greater range of **outcomes data and developing clinical research**
- implementing **early mobilisation as *standard care***; while some aspects of EMOS care have influenced usual practice, there is a continued drive to make early mobilisation a part of usual practice
- closely examining **staffing requirements** to sustain the new approach in the long term.

Section 7

EMOS at a glance

Enhanced Management of Orthopaedic Surgery

a case study in innovation

THE CHALLENGE



increasing demand for orthopaedic surgery

300 day

wait for orthopaedic surgery

5.16 days

length of stay for total knee replacement

6.34 days

length of stay for total hip replacement

The team saw an opportunity to improve patient outcomes, improve patient flow and reduce costs

ENHANCED MANAGEMENT OF ORTHOPAEDIC SURGERY

pre-operative

peri-operative

post-operative

post-discharge

A planned, multidisciplinary improvement project at Coffs Harbour Health Campus. Involves implementation of the existing evidence base to improve outcomes for patients having hip and knee replacements, from initial contact to discharge post-surgery.



planned and coordinated care



teamwork



enhanced recovery approach



early mobilisation

OUTCOMES



reduced length of stay¹

patients removed from waiting list for surgery

due to patient no longer requiring surgery

reduced surgical cancellations

associated with patient not ready

reduced post surgical complications and readmissions



rate of transfer to inpatient rehabilitation decreased by 46%

ENABLERS



project leadership and governance



prepared team

clear roles and responsibilities, education and training

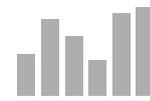


tools

protocols, clinical pathway, recall and reminder systems



patient centred approach



monitoring and evaluation

outcome and process measurement

1. THR LOS reduced to 3.6 days in 2013/14. EMOS patients' LOS shorter than non-EMOS patients by 0.3 days (TKR) to 1.0 days (THR)

Infographic prepared for NSW Agency for Clinical Innovation by Hannah Halloran, healthy partnerships 2016.

Section 8

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