

# CRANIOFACIAL SURGICAL PROCEDURES: POST OPERATIVE CARE - CHW PRACTICE GUIDELINE<sup>®</sup>

## DOCUMENT SUMMARY/KEY POINTS

- Patients undergoing craniofacial surgery can experience significant blood loss which needs to be monitored closely as patients often require a post-operative blood transfusion
- Close nursing observations of patients following craniofacial surgery is essential. Contact the plastic surgery team or after hours RMO immediately if there are any clinical concerns for these patients.

## CHANGE SUMMARY

- Due for mandatory review. Minor changes made through out. Links updated.

## READ ACKNOWLEDGEMENT

- Nursing and medical staff working in surgical areas where craniofacial patients are managed should read and acknowledge they understand the contents of this document.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

<b>Approved by:</b>	SCHN Policy, Procedure and Guideline Committee	
<b>Date Effective:</b>	1 <sup>st</sup> May 2020	<b>Review Period:</b> 3 years
<b>Team Leader:</b>	CNC	<b>Area/Dept:</b> Cleft Lip & Craniofacial Surgery

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## 1 Introduction

This practice guideline covers several common craniofacial surgical procedures. These guidelines are primarily based upon expert clinical opinion of clinicians from The Children's Hospital at Westmead.

Post-operative care will vary slightly for each procedure, so please refer to the appropriate section for each procedure.

## 2 Craniofacial surgery pre-operative preparation

Prior to admission, most of these children will have been reviewed in the Pre-Admission Clinic. At that time, they are seen by the Cleft and Craniofacial Surgery Clinical Nurse Consultant where the patient and parents receive education about post-operative care and management and the patient is assessed by a member of the anesthetic team. The patient will have a pre-operative blood sample taken for full blood count, coags and cross match. Patients who are having **combined** nasal and intracranial procedures including Monobloc and excision of a nasal dermoid cyst with an intracranial extension also require nasal and throat swabs to be collected pre-operatively.

**Table 1** below outlines the pre-operative cross match requirements for craniofacial surgery at The Children's Hospital at Westmead.

Weight at time of surgery	Craniosynostosis		Midface Hypoplasia Monobloc procedure	Hypertelorism	Springs	
	Nil previous surgery	Previous Surgery			Nil previous surgery	Previous surgery
<10kg	1 unit	2 units	N/A	Usually nil	1 unit	2 units
>10kg	2 units	2 units	4 units	4 units	2 units	2 units

Table 1: Units of Blood Required for Craniofacial Surgery

### 3 Spring cranioplasty and posterior vault expansion with cranial springs

Spring cranioplasty is a procedure which is performed to correct some forms of craniosynostosis. It is most commonly performed on patients with sagittal craniosynostosis (premature fusion of the sagittal suture) and may also be used for patients with bicoronal craniosynostosis, (premature fusion of bilateral coronal sutures). The spring cranioplasty procedure for patients with sagittal synostosis is used to make the head wider after an osteotomy of the fused sagittal suture. Patients with bicoronal craniosynostosis may undergo a posterior vault expansion using springs to make the skull vault larger by pushing the occipital bone posterior following a bicoronal osteotomy. If the child is considered too old for the use of springs because the bones are too thick and rigid, a similar procedure can be performed using a distraction device (rather than springs) following the osteotomies.

A spring cranioplasty expands the cranial volume and improves the head shape. The increased intracranial volume decreases the likelihood of the child developing raised intracranial pressure.

A spring cranioplasty is a staged procedure where the springs are inserted in the first procedure and removed 3 months later.

Children with syndromic craniosynostosis, e.g. Apert's Syndrome, may have decreased mid facial growth which affects the structure and function of the pharynx and have a higher risk of airway obstruction at the pharyngeal level<sup>1</sup>. These patients need to be monitored closely with regular observations in the immediate post-operative period.

#### 3.1 Post-operative monitoring / observations

Nursing staff should perform the following observations and document these in the patient's electronic Medical Record ( eMR )If the patients observations do not fall " Between the flags " then nursing staff should contact the appropriate medical team or after hours RMO and arrange for a clinical review.

- **Neurological Observations**  
1/24 hourly for 4/24, then 2/24 for 12 hours until review the following day and then 4/24 after plastic surgery or neurosurgical review. 2/24 neurological observations should continue until ceased by the craniofacial or neurosurgical team. This includes a Glasgow coma scale, pupil responses to light and limb observations and document these observations in the eMR
- **Temperature**  
Should be measured 1/24 for 4/24 then at least 4/24 until discharge
- **Pulse and Respirations**  
Should be performed 1/24 and until the opioid has been ceased and then 4/24 until discharge
- **Blood Pressure**  
Should be monitored as 1/24 for 4/24 hours and then 2/24 for 12/24 until review and then 4/24 until discharge
- **Pulse Oximetry**  
Should be monitored continuously whilst the opioid infusion is in progress and once this infusion has been ceased and then 4/24 until discharge

The observation protocol for children receiving opioid infusions can be found in Section 1.8 of the [Pain Management - CHW](#).

### 3.2 Pain management

Following spring cranioplasty, these patients will return to the ward with an opioid infusion which is Nurse Controlled Analgesia (NCA). Once the patient is comfortable and tolerating oral fluids and diet, the opioid infusion is weaned and oral analgesia commenced as per the pain team recommendations.

For further information on post-operative pain management, see the [Pain Management Guideline - CHW](#).

### 3.3 Fluid maintenance and nutrition

Post-operatively, the patient will have maintenance intravenous therapy until he/she is tolerating oral feeds. Infants may feed on demand and grade up their oral intake as tolerated. Once the patient's oral intake increases intravenous fluids can be reduced.

Patients may have an indwelling catheter in place post-operatively. Nursing staff should monitor the urine output and notify the appropriate medical team if the output is < 1mL/kg/hr.

### 3.4 Wound and drain care

Patients will be given prophylactic antibiotic treatment which will commence in theatre, initially this will be intravenous and this will be changed to oral once the drain has been removed and oral intake has been established. Post-operatively, the patient will have a wound drain in-situ. **The drain is to be on free drainage.** These drains are **not** to be placed on suction as the drain is resting on dura. The drain will be removed when drainage is minimal. Nursing staff are able to remove the drain when requested by the plastic surgery or neurosurgical team

The wound is covered with a gauze strip soaked in tincture of benzoin solution which is sutured to the scalp. This dressing is removed prior to discharge i.e. silk sutures cut and gauze strip removed. The remaining sutures in the skin are dissolving.

The wound should be kept dry for three days following surgery.

At the time of discharge parents may wash the child's hair and they are asked to observe the wound site for signs of infection i.e. redness, warmth, swelling and discharge and notify the plastic surgery team if they have any concerns. There is no need to apply any topical preparations such as Chloromycetin to the scalp wound.

### 3.5 Blood Loss

Significant blood loss is a complication of craniofacial surgery and post –operative blood loss from the wound drain needs to be monitored closely by nursing staff.

The following guidelines for blood loss should be followed after Fronto-orbital remodeling/ Spring cranioplasty (including removal of springs) procedures.

First 3 hours post-surgery	<b>60mL over 3 hours</b>
Thereafter	10mL/hr

Nursing staff should notify the plastic surgery team if drainage is greater than the volumes listed above and the patient should be reviewed by a medical officer

Patients occasionally require a blood transfusion following a spring cranioplasty procedure. All patients will have a post-operative full blood count performed on either the evening of the day of surgery or the following morning. If indicated, the patient will receive a blood transfusion or treatment with oral iron supplements to treat post-operative anaemia. The drain will be removed with drainage is minimal.

### **3.6 Post-operative swelling**

The head of the patient's bed should be elevated to 30 degrees to minimize post-operative swelling. Patients should be nursed in a supine position.

### **3.7 Discharge instructions**

The patient will receive a prescription for oral antibiotics for a week's treatment in total. Patients should not return to day care for several weeks.

Patients will be seen in the Craniofacial Clinic for post-operative review and this appointment may be made via the Outpatient Department or by contacting the Craniofacial Clinic secretary on 9845 0918.

If the parents have any concerns after discharge, they may contact the Cleft and Craniofacial surgery Clinical Nurse Consultant or the plastic surgery team via the switchboard.

## 4 Removal of springs

This procedure is usually performed 3 months after the initial spring cranioplasty. The procedure involves reopening the previous scar and removal of the springs. This procedure is associated with lower blood loss than the initial procedure when the springs were inserted.

### 4.1 Post-operative monitoring / observations

Nursing staff should perform the following observations and document these in the patient's electronic Medical Record ( eMR )If the patients observations do not fall " Between the flags " then nursing staff should contact the appropriate medical team or after hours RMO and arrange for a clinical review.

- **Temperature**  
Should be measured 1/24 for 4/24 then at least 4/24 until discharge
- **Pulse and Respirations**  
Should be performed 1/24 and until the opioid has been ceased and then 4/24 until discharge
- **Blood Pressure**  
Should be monitored as 1/24 for 4/24 hours and then 4/24 until discharge
- **Pulse Oximetry**  
Should be monitored continuously whilst the opioid infusion is in progress and once this infusion has been ceased then 4/24 until discharge

The observation protocol for children receiving opioid infusions can be found in Section 1.8 of the [Pain Management - CHW](#).

### 4.2 Pain management

Following removal of springs, these patients **may** return to the ward with an opioid infusion which is Nurse Controlled Analgesia (NCA). Once the patient is comfortable and tolerating oral fluids/ diet the opioid infusion is weaned and oral analgesia commenced as per the pain team recommendations.

For further information on post-operative pain management see: [Pain Management - CHW](#)

### 4.3 Fluid maintenance and nutrition

Post-operatively, the patient will have maintenance intravenous therapy until he/she is tolerating oral feeds. Infants may feed on demand and grade up their oral intake as tolerated. Once the patient's oral intake increases intravenous fluids can be reduced.

### 4.4 Wound and drain care

Patients will be given prophylactic antibiotic treatment which will commence in theatre, initially this will be intravenous and this will be changed to oral once oral intake is satisfactory and the drain has been removed.

Mostly these patients do not have a drain in situ but if they do the drain will be removed when drainage is minimal.

The wound is covered with a gauze strip soaked in tincture of benzoin solution which is sutured to the scalp. This dressing is removed prior to discharge i.e. silk sutures cut and gauze strip removed. The remaining sutures in the skin are dissolving.

The wound should be kept dry for three days following surgery.

At the time of discharge parents may wash the child's hair and they are asked to observe the wound site for signs of infection i.e. redness, warmth, swelling and discharge and notify the plastic surgery team if they have any concerns. There is no need to apply any topical preparations such as Chloromycetin to the scalp wound.

## **4.5 Blood loss**

There is usually minimal blood loss following removal of springs. However, patients should be observed for signs of bleeding; i.e. post-operative observations should be performed and recorded. A medical review is required if drainage is greater than 10mls/hr.

## **4.6 Discharge instructions**

Patients will be seen in the Craniofacial Clinic for post-operative review and this appointment may be made via the Outpatient Department or by contacting the Craniofacial Clinic secretary on (02) 9845 0918.

If the parents have any concerns after discharge, they may contact the Cleft and Craniofacial surgery Clinical Nurse Consultant or the plastic surgery team via the switchboard.

## 5 Fronto-orbital remodeling (FOR)

Fronto-Orbital Remodelling (FOR) (also known as a Fronto-Orbital Advancement) is a procedure that is performed to correct the forehead deformity created by metopic or coronal (unilateral or bilateral) craniosynostosis. This procedure involves a bicoronal incision. The frontal bone is removed and remodelled before being replaced and wired in situ.

### 5.1 Post-operative monitoring / observations

Nursing staff should perform the following observations and document these in the patient's electronic Medical Record (eMR) If the patient's observations do not fall "Between the flags" then nursing staff should contact the appropriate medical team or after hours RMO and arrange for a clinical review.

- **Neurological Observations**  
1/24 hourly for 4/24, then 2/24 for 12 hours until review the following day and then 4/24 after plastic surgery or neurosurgical review. 2/24 neurological observations should continue until ceased by the craniofacial or neurosurgical team. This includes a Glasgow coma scale, pupil responses to light and limb observations and document these observations in the eMR
- **Temperature**  
Should be measured 1/24 for 4/24 then at least 4/24 until discharge
- **Pulse and Respirations**  
Should be performed 1/24 and until the opioid has been ceased and then 4/24 until discharge
- **Blood Pressure**  
Should be monitored as 1/24 for 4/24 hours and then 2/24 for 12/24 until review and then 4/24 until discharge
- **Pulse Oximetry**  
Should be monitored continuously whilst the opioid infusion is in progress and once this infusion has been ceased then 4/24 until discharge

The observation protocol for children receiving opioid infusions can be found in Section 1.8 of [Pain Management - CHW](#).

### 5.2 Fluid maintenance and nutrition

Post-operatively, the patient will have maintenance intravenous therapy until he/she is tolerating oral feeds. Infants may feed on demand and grade up their oral intake as tolerated. Once the patient's oral intake increases intravenous fluids can be reduced.

Patients may have an indwelling catheter in place post-operatively. Nursing staff should monitor the urine output and notify the appropriate medical team if the output is < 1mL/kg/hr.

### 5.3 Pain management

These patients will return to the ward with an opioid infusion which is Nurse Controlled Analgesia (NCA). Once the patient is comfortable and tolerating oral fluids and diet, the

opioid infusion is weaned and oral analgesia commenced as per the pain team recommendations.

For further information on post-operative pain management, see the [Pain Management Guideline - CHW](#)

## 5.4 Wound and drain care

Patients will be given prophylactic antibiotic treatment which will commence in theatre, initially this will be intravenous and this will be changed to oral once the drain has been removed and oral intake has been established. Post-operatively, the patient will have a wound drain in-situ. **The drain is to be on free drainage.** These drains are **not** to be placed on suction as the drain is resting on dura. The drain will be removed when drainage is minimal. Nursing staff are able to remove the drain when requested by the plastic surgery or neurosurgical team

The wound is covered with a gauze strip soaked in tincture of benzoin solution which is sutured to the scalp. This dressing is removed prior to discharge i.e. silk sutures cut and gauze strip removed. The remaining sutures in the skin are dissolving.

The wound should be kept dry for three days following surgery.

At the time of discharge parents may wash the child's hair and they are asked to observe the wound site for signs of infection i.e. redness, warmth, swelling and discharge and notify the plastic surgery team if they have any concerns. There is no need to apply any topical preparations such as Chloromycetin to the scalp wound.

## 5.5 Blood loss

Significant blood loss is a complication of craniofacial surgery and post -operative blood loss from the wound drain needs to be monitored closely by nursing staff.

The following guidelines for blood loss should be followed after Fronto-orbital remodeling/ Spring cranioplasty (including removal of springs) procedures.

First 3 hours post-surgery	<b>60mL over 3 hours</b>
Thereafter	10mL/hr

Nursing staff should notify the plastic surgery team if drainage is greater than the volumes listed above and the patient should be reviewed by a medical officer

Patients occasionally require a blood transfusion following a spring cranioplasty procedure. All patients will have a post-operative full blood count performed on either the evening of the day of surgery or the following morning. If indicated, the patient will receive a blood transfusion or treatment with oral iron supplements to treat post-operative anaemia. The drain will be removed with drainage is minimal.

## **5.6 Post-operative swelling**

These patients experience significant post-operative swelling. Patients are generally unable to open their eyes due to this swelling. The bed head should be elevated to 30 degrees to assist with reduction of this swelling. Patients should be nursed in a supine position.

## **5.7 Discharge instructions**

The child will receive a prescription for oral antibiotics for a week's treatment in total. Patients should not return to day care for several weeks.

Patients will be seen in the Craniofacial Clinic for post-operative review and this appointment may be made by contacting the Craniofacial Clinic secretary on (02) 9845 0918.

If the parents have any concerns after discharge, they may contact the Cleft and Craniofacial surgery Clinical Nurse Consultant or the plastic surgery team via the switchboard.

## 6 Cranioplasty using Hydroxyapatite

Cranioplasty using hydroxyapatite is a procedure used to re-contour forehead irregularities. These irregularities may arise from previous craniofacial surgery such as fronto-orbital remodeling procedures. The original bicoronal incision is reopened and hydroxyapatite is used to re-contour the forehead.

### 6.1 Post-operative monitoring / observations

Nursing staff should perform the following observations and document these in the patient's electronic Medical Record ( eMR ) If the patients observations do not fall " Between the flags " then nursing staff should contact the appropriate medical team or after hours RMO and arrange for a clinical review.

- **Temperature**  
Should be measured 1/24 for 4/24 then at least 4/24 until discharge
- **Pulse and respirations**  
Should be performed 1/24 and until the opioid has been ceased and then 4/24 until discharge
- **Blood pressure**  
Should be monitored as 1/24 for 4/24 hours and then 4/24 until discharge
- **Pulse Oximetry**  
Should be monitored continuously whilst the opioid infusion is in progress and once this infusion has been ceased and then 4/24 until discharge

The observation protocol for children receiving opioid infusions can be found in Section 1.8 of the: [Pain Management - CHW](#).

### 6.2 Fluid maintenance and nutrition

Post-operatively the patient will have maintenance intravenous therapy until he/she is tolerating oral feeds. These patients may eat and drink on demand and grade up their oral intake as tolerated. Once oral intake increases intravenous fluids can be reduced.

### 6.3 Pain management

Following hydroxyapatite cranioplasty these patients will return to the ward with an opioid infusion which is Nurse Controlled Analgesia ( NCA ) if the child is younger than 6 years of age or Patient Controlled Analgesia ( PCA ) if the child is 6 years or older. Once the patient is comfortable and tolerating oral fluids/ diet the opioid infusion is weaned and oral analgesia commenced as per the pain team recommendations.

For further information on post-operative pain management see: [Pain Management - CHW](#)

### 6.4 Wound and drain care

Patients will prophylactic antibiotic treatment which will initially be intravenous which will be changed to oral once oral intake is satisfactory and the drain has been removed.

Post-operatively the patient will have a wound drain in situ. This drain is to be maintained **with** suction. The drain will be removed when the drainage is minimal.

The wound is covered with a gauze strip soaked in tincture of benzoin solution which is sutured to the scalp. This dressing is removed prior to discharge i.e. silk sutures cut and gauze strip removed. The remaining sutures in the skin are dissolving.

The wound should be kept dry for three days following surgery.

At the time of discharge parents may wash the child's hair and they are asked to observe the wound site for signs of infection i.e. redness, warmth, swelling and discharge and notify the plastic surgery team if they have any concerns. There is no need to apply any topical preparations such as Chloromycetin to the scalp wound.

## 6.5 Blood loss

The following guidelines apply following cranioplasty with hydroxyapatite.

The drain should be checked hourly and nursing staff should notify the plastics surgery registrar if there is > 20mL/hour drainage.

## 6.6 Post-operative swelling

These patients experience post-operative swelling. The bed head should be elevated to 30 degrees to assist with reduction of this swelling. Patients should be nursed supine rather than on their sides.

## 6.7 Discharge instructions

The child will receive a prescription for oral antibiotics for a week's treatment in total.

Patients will be seen in the Craniofacial Clinic for post-operative review and this appointment may be made by contacting the Craniofacial Clinic secretary on 9845 0918.

If the parents have any concerns after discharge, they may contact the Cleft and Craniofacial surgery Clinical Nurse Consultant or the plastic surgery team via the switchboard.

## 7 Reference

1. Hayward R. Jones B. Dunaway D. Evans R. The Clinical Management of Craniosynostosis p 161 , 2004

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