

Improving in-patient outcome after idiopathic spine deformity surgery by an Enhanced Recovery Pathway (ERP) and Enhanced Recovery After Surgery (ERAS) philosophy - initial results of helping young people get better more quickly.



Sophie Adams



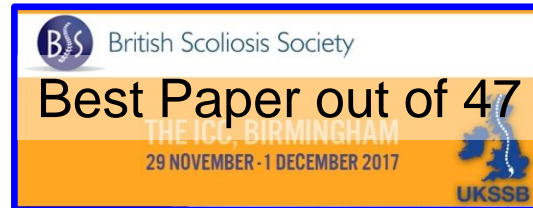
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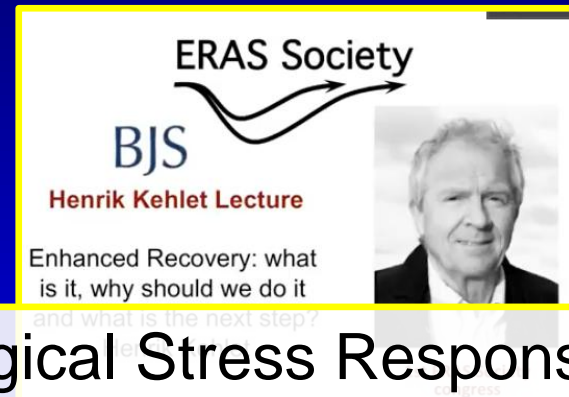
The Scottish National Spine Deformity Service team
Quality Improvement Project Registration: Project ID: 2017-14

Conflicts: None Funding: None

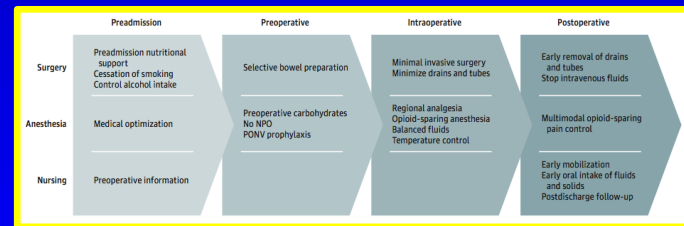
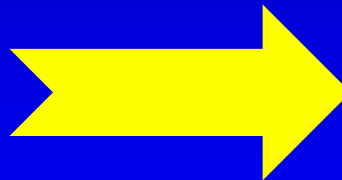
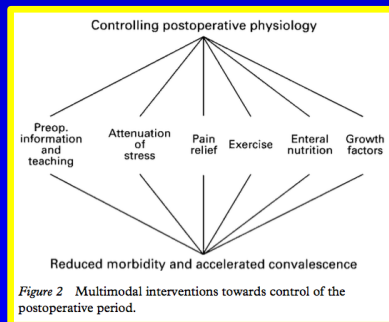
Enhanced Recovery Pathway (ERP) and Enhanced Recovery After Surgery (ERAS) philosophy

- 1997 = “Multimodal approach to control postoperative pathophysiology and rehabilitation”

- 2017



Post-operative morbidity / Surgical Stress Response



H. Kehlet. (1997).
Br J Anaesth; 78(5): 606-17.
PubMed: 9175983

O. Ljungqvist, M. Scott, et al. (2017).
"Enhanced Recovery After Surgery: A Review".
JAMA Surg; 152(3): 292-298.
PubMed: [28097305](https://pubmed.ncbi.nlm.nih.gov/28097305/)

Scottish National Spine Deformity Service

- Getting it right for each individual at all times

- Pathways from Service inception in April 2005
- Reviewed annually

<p>1st DAY POST-OPERATIVE CARE</p> <p>RHSC Ward: _____ Date: _____ Name: _____</p> <p>Each patient MUST BE ACKNOWLEDGED</p> <p>Each patient MUST BE ACKNOWLEDGED</p>	
<p>Observations</p> <p>Temperature 2-4 hourly BP 15 hourly recorded</p> <p>While patient receiving morphine:</p> <p>Pulse and respiratory 15 hourly</p> <p>Spinal drainage:</p> <p>CSF level: _____</p> <p>CSF colour: _____</p> <p>CSF volume: _____</p> <p>CSF flow: _____</p>	<p>Initial + time as achieved, N/A or</p> <p>Day Night</p>
<p>IV access</p> <p>Central line for removal Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p> <p>Arterial line for removal <input type="checkbox"/> removed <input type="checkbox"/> N/A <input type="checkbox"/></p> <p>PVC Bundle Updated Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>CVC Bundle Updated Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p>	<p>Removed</p>
<p>Intravenous fluids</p> <p>Intra-venous fluids ongoing as per prescription dependant on oral intake</p>	
<p>Urine Output</p> <p>Urine output measured and documented</p> <p>Catheter care carried out Yes <input type="checkbox"/> No <input type="checkbox"/></p>	
<p>Drain</p> <p>Wound drain patent & draining</p> <p>Wound drain for removal Yes <input type="checkbox"/> No <input type="checkbox"/></p>	
<p>Wound</p> <p>Dressing dry & intact Yes <input type="checkbox"/> No <input type="checkbox"/></p>	
<p>Bowels</p> <p>Bowels opened Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Prescribe stool softener/laxative</p>	
<p>Neurology</p> <p>Neurological checks according to neurological chart guidelines pg 12/13</p>	
<p>Anti Embolism Therapy</p> <p>TED stockings intact and wrinkle free Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Flowtron Universal Intermittent Pneumatic Compression Boots in situ Yes <input type="checkbox"/> No <input type="checkbox"/> (pg. 17/18)</p> <p>All adolescent/Idiopathic scoliosis patients</p>	
<p>Parent(s) / Child</p> <p>Parents - free access</p> <p>Child & parent(s) kept informed of progress</p>	
<p>Mobility</p> <p>Positioning as per surgeon's post-operative instructions on p. 10</p> <p>Appropriate analgesia given 1 hr prior to 0800hrs, Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Glamorgan Tool updated Yes <input type="checkbox"/> No <input type="checkbox"/></p>	
<p>Dietician</p> <p>Encourage with diet and fluids</p>	
<p>ANAESTHETIST / PAIN MANAGEMENT NURSE</p> <p>Pain Management</p> <p>PCA Yes <input type="checkbox"/> No <input type="checkbox"/> Morphine infusion Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Pain scoring documented</p> <p>NSAIDs & paracetamol prescribed/given regularly</p> <p>Anti-emetics prescribed / given</p> <p>Ep(0)ary Paton Monitoring Chart Commenced Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p> <p>HCA background/infusion decreased by anaesthetist or pain nurses <input type="checkbox"/></p>	
<p>1st post operative day issues for consideration</p> <ul style="list-style-type: none"> • Central line maintained • Pain well managed • All drain patent and unclamped • Urrometer remains in situ • Blood loss managed, patient well hydrated <p>If Blood Transfusion required Documentation for Transfusion of Blood Components Commenced</p>	

- We look to the rest of the U.K. and beyond to set our reference standard of care. The main group of healthcare professional representing the care of those with spine deformity in the U.K. is the British Scoliosis Society. The aim of this society is to represent surgeons, healthcare workers and researchers interested in the nature and treatment of scoliosis and complex spine deformity.
- Internal on intranet
 - Standards
 - U.K.
 - Protocols
 - Pathways
 - Outcomes
- | Name | Modified |
|---|----------|
| British Scoliosis Society Spine Deformity Standards 2006 | 21 July |
| DRAFT,CPG reg form Spine Deformity Service - Emergency post operative neurology imaging R | 21 July |
| DRAFT,CPG Spine Deformity Service - Emergency post operative neurology imaging RHSC V2 | 21 July |
| Physiotherapy Review Spinal Deformity - Guideline 2014 | 21 July |
| PROTOCOL New AIS ward 4 HDU pathway v1 09June2014 | 21 July |
| DRAFT Spine Deformity Enhanced Recovery Pathway - patients with AIS | 21 July |
| DRAFT Spine Deformity Enhanced Recovery Pathway - preoperative letter AIS | 21 July |
| Enhanced Recovery Pathway - Spinal Anaesthesia (updated 2014) | 21 July |
| SNSDS Enhanced Recovery Pathway - Spinal Anaesthesia v08Dec2016, case 1 | 21 July |
| SNSDS Enhanced Recovery Pathway - Spinal Anaesthesia v08Dec2016, case 2 | 21 July |
| British Spine Registry and IOM- Form version 2.19Aug2014 | 21 July |
| Scoliosis Research Society questionnaire 30 | 21 July |

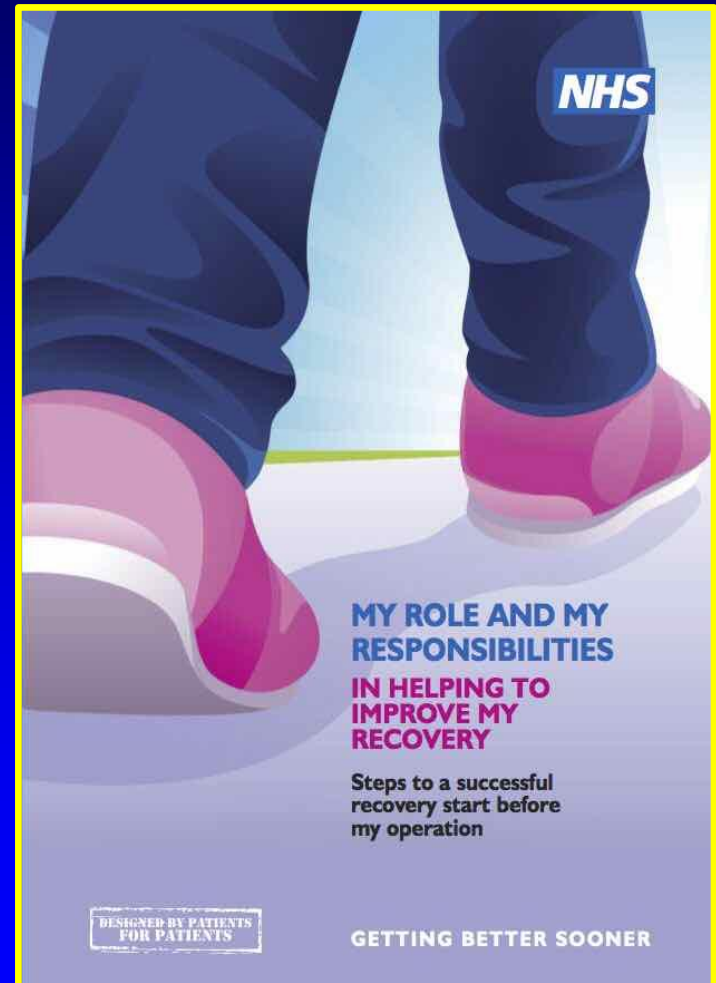
Enhanced Recovery and the NHS

NHS choices Your health, your choices

- ERP “a modern evidence-based approach that helps people recover more quickly after having major surgery.”

- **Important points**

- Eating well
- Exercise
- Relaxation
- Smoking and alcohol

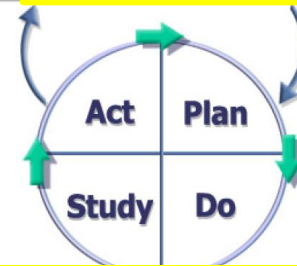




Aim and Methods

- Aim - Assess whether incorporating an ERP benefits patient outcome.
- PDSA cycles
 - Plan starts
 - First January 2015
 - Second May 2016

Model for Improvement



 Institute for
Healthcare
Improvement

Improving Health and Health Care Worldwide

- “Best Practice in Clinical Audit”
Sept 2016





SNSDS – ERP – 1. and 2.

1. Pre Admission

- Patient participation in recovery to normality
- Pre-operative education
- Service visit and former patient contact

• Nutrition

- Assessment (Paediatric Yorkhill Malnutrition Score - PYMS)
- Dietary advice and education
- “Tic Tac Training”

2. Pre Operative

- Strategies to reduce nausea and vomiting
- Pain
 - Expectations
 - Control

• Nutrition

- Laxative
- Mobilisation education and manoeuvres



SNSDS – ERP – 3. and 4.

3. Intra Operative

- Decrease tissue damage
- Decrease surgical time
- Decrease bleeding
 - GA
 - Tranexamic acid
 - Haemostatic Gelatines
- Wound infiltration
 - 1ml 0.25% levobupivacaine per Kg

4. Post Operative

- Aiming for normal activities
- Fluids
 - Oral
 - Urine output
- Nutrition
 - Food
- Multimodal analgesia
 - Includes non-steroidals

First Post-Op Day

Fentanyl Patch (micrograms)

Regular Clonidine (micrograms) from 0600 (0600, 1400, 2200)

Stop PCA at 0900

Sevredol/Oral Morphine Solution (mgs hourly max 8/24hrs) PRN when PCA discontinued

Regular Paracetamol and Ibuprofen/Diclofenac - doses as above

Regular IV Ondansetron - dose as above

Diazepam mgs as required (6hrly max 3/24hrs)

Commence laxatives - Lactulose mls (0800/2000) and Sodium Picosulfate mgs (0800)

Stop IV fluids when PCA discontinued - encourage fluid and dietary intake and ensure accurate fluid balance chart - if intake not reached volume recommended by consultant IV fluids to be recommenced over night

Trans-urethral catheter: to be removed 3 hours following PCA stopping (1200)

****No further antibiotics required****



Patients and Methods

Group 1 – standard pathway

- PDSA – Study
- April 2015 to March 2016
- Only patients with idiopathic scoliosis
- N = 95
- Paper case notes
- TRAK and ORSOS

Group 2 - ERP

- PDSA – Study (ongoing)
- February to June 2017
- Only patients with idiopathic scoliosis
- N = 28 patients
- eCasenotes
- TRAK and ORSOS

- Statistical tests
 - F – test for variance
 - Student t-Test, two-tail

Healthcare Quality Improvement Partnership (2015).
"An introduction to statistics for local clinical audit and improvement."
HQIP
www.hqip.org.uk/resources






Results

	Group 1 n= 95 Standard pathway	Group 2 n=28 ERP	Statistical significance
Age	14.9 years (11-19)	14.0 years (11-19)	NS
Length of stay	6.8 days (4-21)	5.7 days (3-23)	NS
Catheter removal	2.9 days (2-5)	1.3 days (1-2)	p<0.001
To chair	2.1 days (1-5)	1.2 days (1-3)	p<0.001
First walking	2.7 days (1-6)	1.2 days (1-3)	p<0.001



Results – Morphine equivalent use

- Conversions to PO Morphine (mg)
 - IV Morphine (mg) x 2.5
 - PO Codeine (mg) x 0.1
 - PO Tramadol (mg) x 0.15
 - Transdermal Fentanyl
 - 12mcg/hr = 45mg in 24hrs
 - 6mcg/hr = 22.5mg in 24hrs


FACULTY OF PAIN MEDICINE

[Home](#) > [Dose Equivalent and Changing Opioids](#)

Dose Equivalent and Changing Opioids

B. Fentanyl

Fentanyl patch strength (microgram/hr)	Oral morphine (mg/day)
12	45

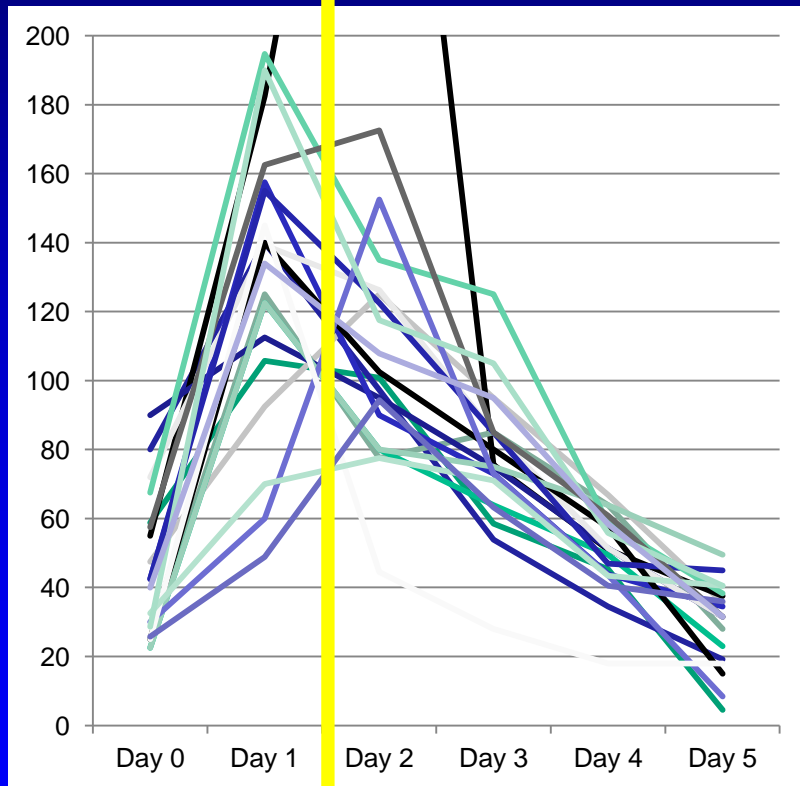
Approximate equi-analgesic potencies of opioids for oral administration

	Potency ratio with oral morphine	Equivalent dose to 10mg oral morphine
Codeine phosphate	0.1	100mg
Dihydrocodeine	0.1	100mg
Hydromorphone	7.5	1.3mg
Methadone	*	*
Morphine	1	10mg
Oxycodone	2	5mg
Tapentadol	0.4	25mg
Tramadol	0.15	67mg

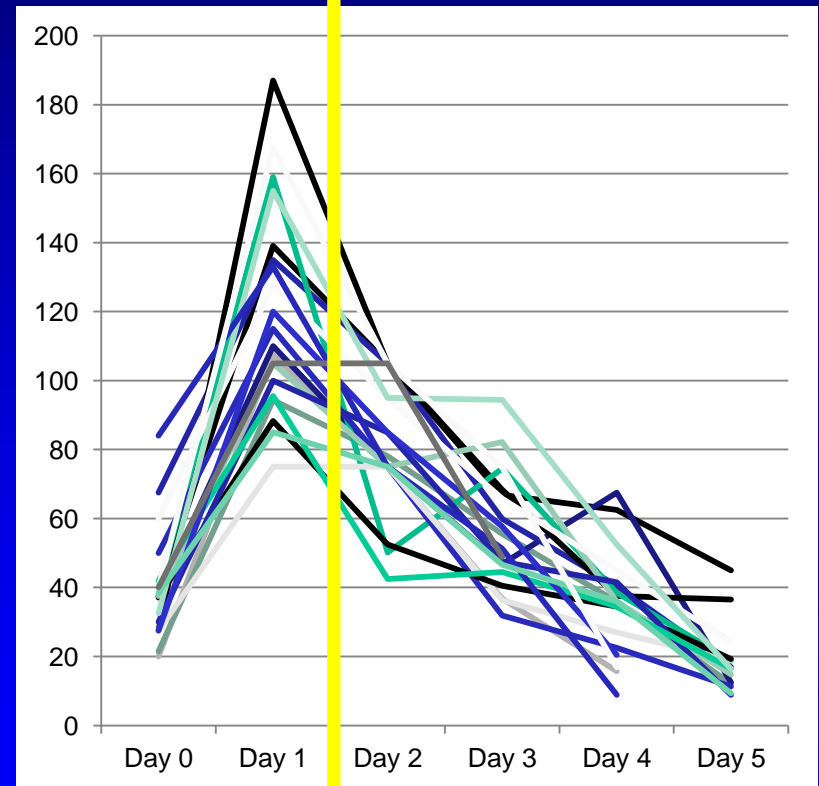


Results – Morphine equivalent use

Group 1 (n = 20/ 95)
Standard Pathway



Group 2 (n = 20/ 28)
ERP

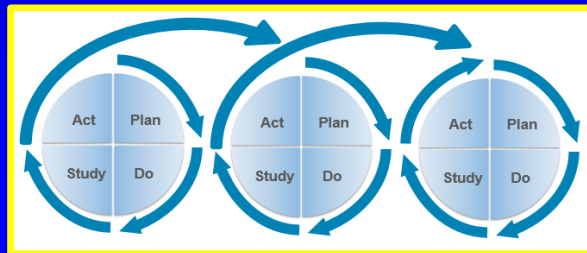


From post op day 2 onwards $p = 0.023$ or less



Discussion and Conclusions

- Our Enhanced Recovery Pathway
 - Discharge earlier by average of 1 day.
 - Significant less morphine equivalent analgesia.



Scottish National Spine Deformity Service

You are in: Home > Services > Health Services A-Z > Scottish National Spine Deformity Ser

Scottish National Spine Deformity Service

Information for Patients and Relatives

Spine Conditions and Operations

The Team

Information for Clinical Staff

Contact Us


Useful Links

Scottish National Spine Deformity Service

The Scottish National Spine Deformity service (SNSDS) exists to provide a and adult spinal deformity service to the residents of Scotland. This service is commissioned by National Services Division in 2005. The service provides holistic care and support for every patient.

The spinal operations are performed at two hospitals in Edinburgh; the Royal Hospital of Edinburgh. Clinics are held at these hospitals and the new Royal Hos

ERP



We use patient's journey or pathways as a basis for personalising care for each individual. We believe in listening and learning from our patients. This web site is to add yet more to help with our knowledge.

This picture October 2017 showing a patient on the 6th day after spine surgery for scoliosis. She is another success for the Enhanced Recovery Pathway.

Old Standard



service to the residents of Scotland. This service is commissioned by National Services Division in 2005. The service is staffed by a wide ranging team of professionals and support for every patient.

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