

Slings, belts & corsets for emergency  
pelvic stabilisation: what works and  
what doesn't?

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# Introduction

- ▶ A significant proportion of deaths from pelvic fracture are due to exanguination
- ▶ Bleeding occurs from cancellous bone surfaces, the presacral venous plexus and iliac vessels
- ▶ The sooner bleeding is controlled, the greater the chance of avoiding the “lethal triad”



# Introduction

- ▶ The pelvic binder is established in resuscitation protocols
- ▶ Much as the cervical collar is used to protect from further injury, the pelvic binder is used where injury is suspected before definitive imaging
- ▶ Widely adapted as the initial stabilization of choice for the immediate management of pelvic ring injuries
- ▶ Promoted to maintain or restore mechanical and haemodynamic stability prior to definitive care

Pelvic compression has long been advocated to control haemorrhage in pelvic injury:

- ▶ Reduction and stabilisation of the pelvic ring is thought to decrease fracture site bleeding
- ▶ Protects any initial blood clot from disruption
- ▶ In theory decreases the pelvic volume to create a tamponade effect thereby reducing venous bleeding

Pelvic compression has long been advocated to control haemorrhage in pelvic injury:

- ▶ But 3D modelling using CT demonstrated the pelvis is a hemi-elliptical sphere and absolute volume does not increase dramatically with changes in diameter
- ▶ Pelvic haemorrhage spreads through disrupted tissues planes into the retroperitoneum . “Closing the pelvis” does not prevent this
- ▶ The binder splints the bony pelvis by compressing and stabilizing fractures, reducing low-pressure bleeding from bone ends and disrupted veins

## The binder is not used to:

- ▶ Reduce the volume of the pelvis
- ▶ Achieve perfect anatomical alignment
  - Excessive force may exacerbate certain injuries
- ▶ Control arterial bleeding
  - If there is no improvement haemodynamically following the application of the binder, urgent angio-embolisation or operative intervention considered

## Functions of the pelvic binder

- ▶ To splint the bony pelvis
- ▶ To reduce pain and movement during transfers
- ▶ To provide some integrity to the pelvis during operative packing
- ▶ To provide stabilisation to the pelvis until definitive stabilisation





# History

- ▶ Early improvisations for pelvic wrapping- bed sheets. Readily available but not easy to apply effectively
- ▶ MAST mid 1970s - cumbersome and restricted access.
- ▶ Pelvic external fixation - surgical expertise and time consuming. No benefit over the binder.
  - Reduced transfusion requirements with the binder compared with EPF may be attributable to ease and speed of application of binder

## The ideal pelvic binder

- ▶ Suitable for use pre-hospital and ED
- ▶ Lightweight and easily applied
- ▶ Soft and comfortable
- ▶ Washable or cheap enough to be disposable
- ▶ One size fits all
- ▶ Allow access to abdomen and groins

## Binder options

- ▶ Several commercial versions on the market
  - A simple velcro belt
  - The pelvigrip – differential attachments allows access by releasing individual straps
  - The SAM splint – difficult access to the groin without removing. Controlled tension avoids risk of over-reduction
  - The T-POD – complex, excessive force and difficult access

There is no evidence to suggest that any one is superior



# The Christchurch binder

- ▶ Innovative
- ▶ A simple home-made design
- ▶ Soft fabric and velcro
- ▶ Satisfies the characteristics of the ideal binder
- ▶ Effective

# The Christchurch binder



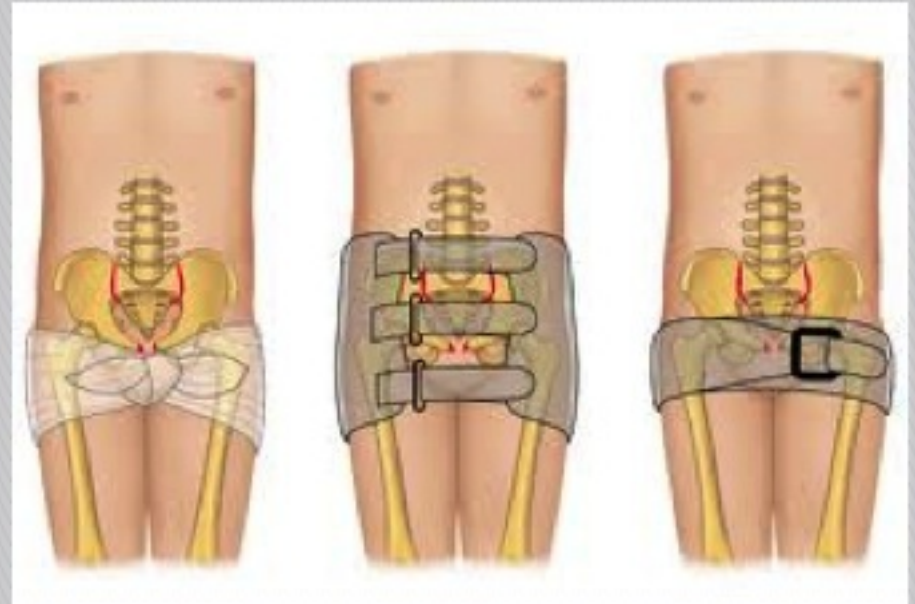
# Pre- & post-Christchurch binder





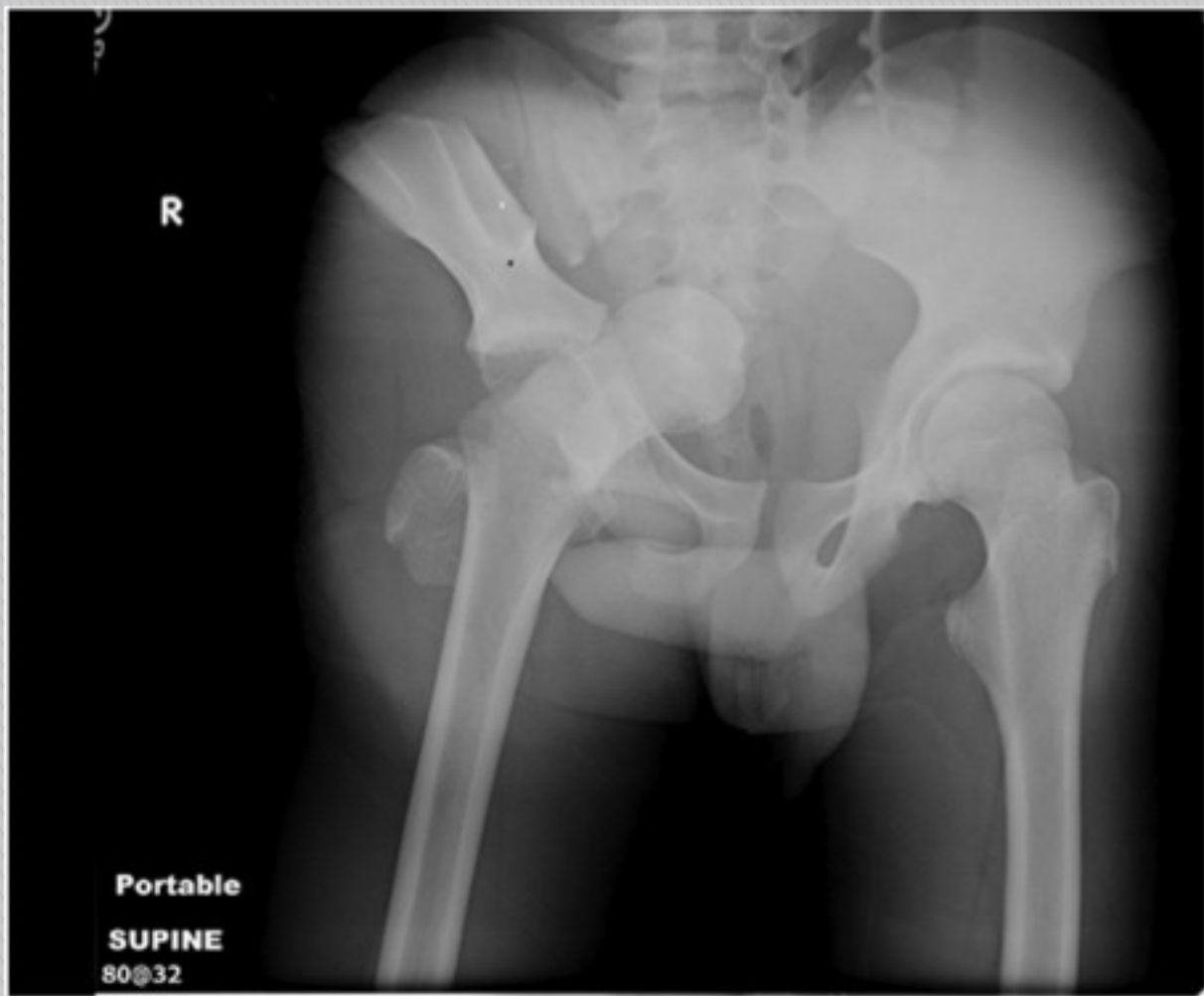
# Correct positioning

- ▶ Application at the level of the greater trochanters is most effective
- ▶ Training
- ▶ 38.9% ED Regs and 79.1% Ortho Regs identified the correct position



# Complications

- ▶ Pressure areas – uncertain how long a pelvic binder can be safely used and how often it should be released for the skin to be inspected
- ▶ Theoretical risk of missing radiological signs of diastasis if adequately reduced with a binder
- ▶ Overcorrection in lateral compression injuries – no reports in the literature to suggest harm.
  - Over-reduction is avoided without using extreme force, but using as a splint will provide temporary stabilisation and pain relief



- ▶ Pelvic binder is a practical adjunct to the immediate resuscitation of the hypovolaemic trauma patient
- ▶ Little study of clinical outcome measures. Some data to support improved haemodynamic status
- ▶ No clear consensus on which binder is superior



# References

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