

The making of a spleen guard to normalize life

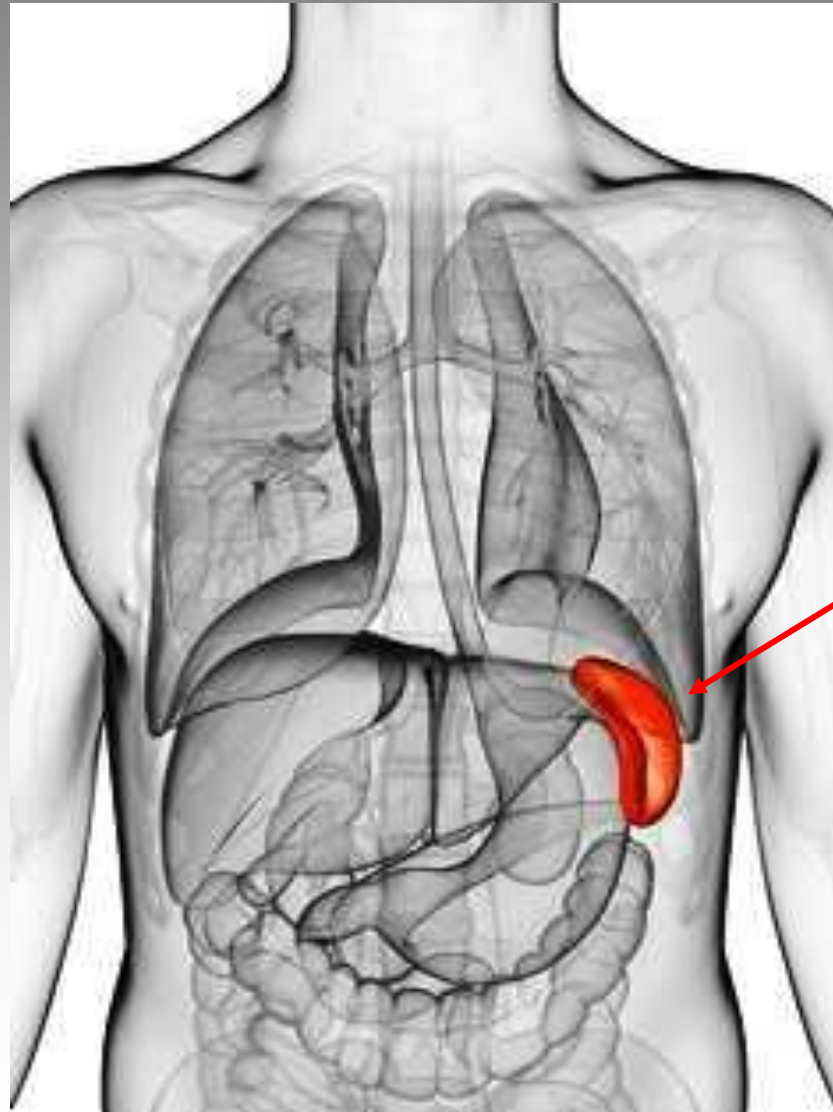
Aspects of Clinical Assessment, Measurement, and Fabrication

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Goals of Presentation

- Basic review of spleen
- Patient guidelines
- Clinical and Technical Guide for Orthotists
- Recommendations for future research

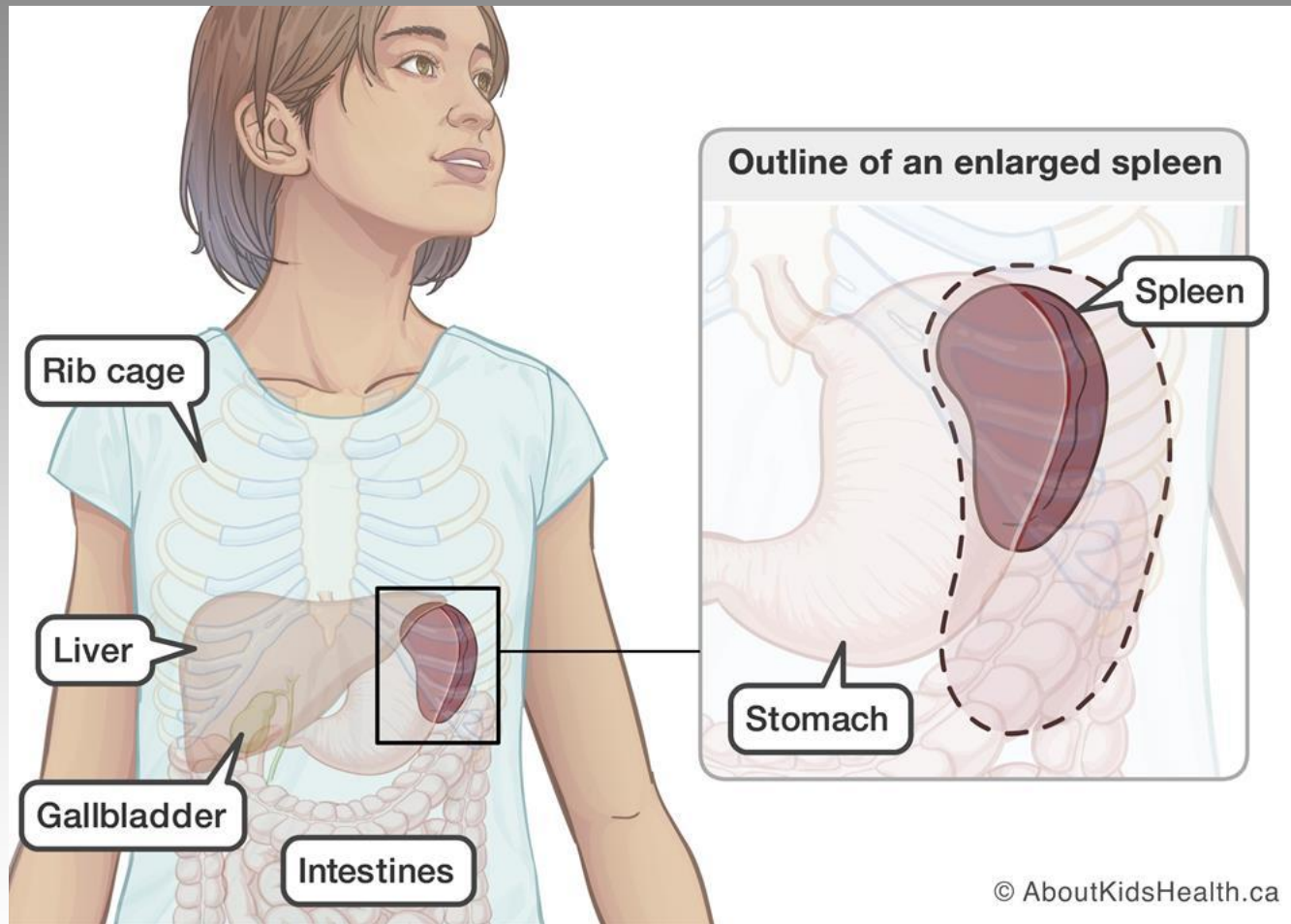
The Spleen



Spleen

Enlarged Spleen

“Splénomegaly”



Disorders that can cause the spleen to enlarge

- Infections
- Liver Diseases
- Hemolytic Anemias
- Cancers
- Other causes

What is a Spleen Guard?



- Who need spleen protectors?
- Why do their spleens need protection?
- Why are spleen guards important

Other Devices that have been used

- Football Torso Guards
- Motorcycle protection gear
- General back braces
- Bulky
- Generic shape / size
- OTS
- Not kid friendly



Current Spleen Guard Design

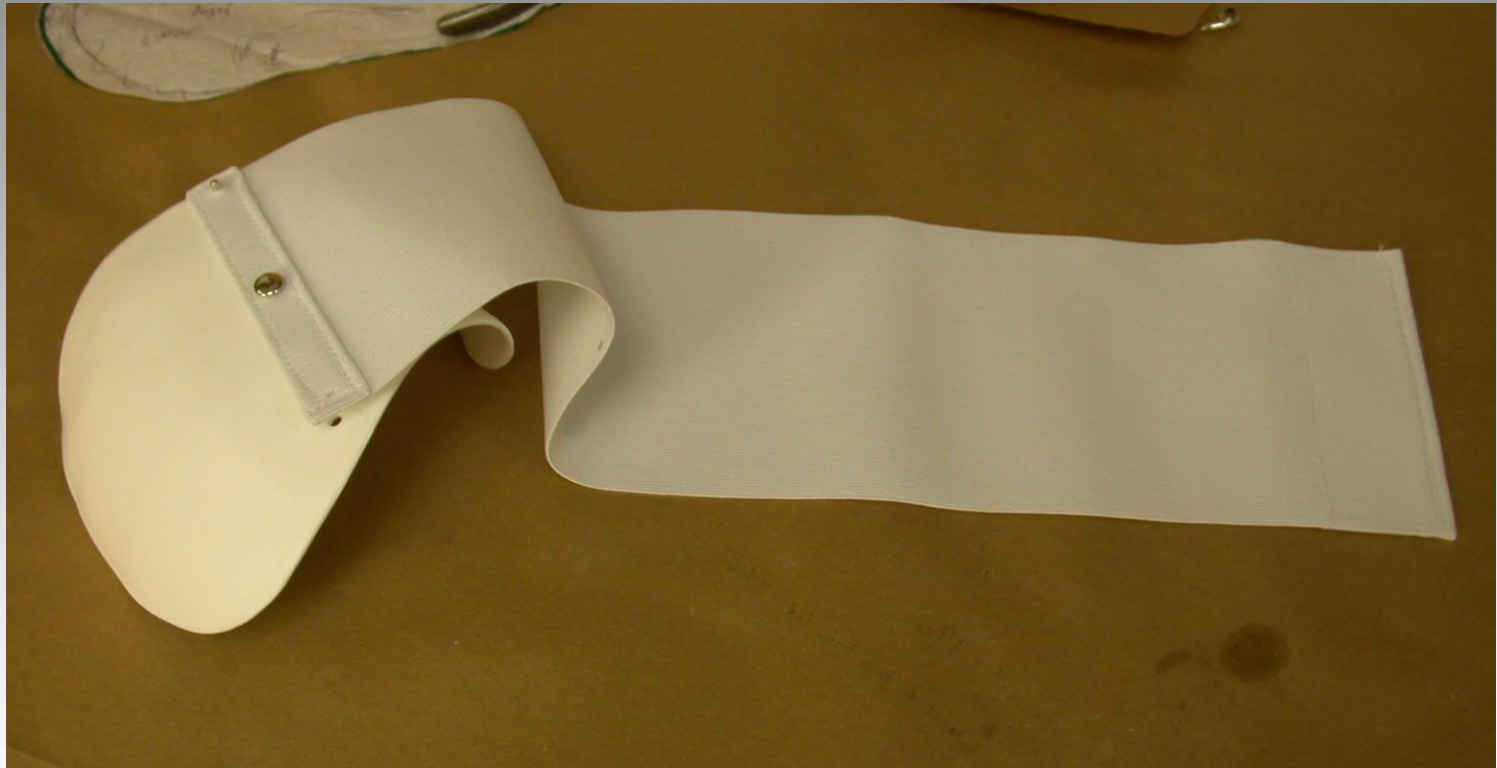
Low Temperature



High Temperature



Present Design / Low Temp



Hi temperature plastic version



Clinical & Technical Aspects

- Necessary Documentation
- Materials
- Evaluation & Measurements
- Fitting & Fabrication
- Guidelines & Education
- Research

Necessary Documentation

- Rx: Spleen Guard
- Dx: ICD-10
- Patients name & DOB
- Physicians Signature & Date

The image shows a blank prescription form with a blue border. At the top left is a large 'Rx' symbol. To its right are two sets of horizontal lines for 'PATIENT NAME:' and 'ADDRESS:'. Below these is a large horizontal line, followed by the word 'Prescription:'. At the bottom, there are two horizontal lines for 'Signature:' and 'Date:'.

LMN

- What is it?
- Why do you need this?
- What should it include?

Coding

- The HCPCS codes
- There is no definitive code currently for a “spleen guard” or kidney
- Spinal Unlisted Procedure Code L1499 or E1399

Costs

- Unlisted procedural code work sheets

Necessary Materials

Low Temperature Plastics

- Plastic
- Tubular Cotton Stockinette
- Tracing paper
- erasable pencil or washable Crayola markers
- Ace Wrap x 2
- Oven, water bath, or heat gun
- Cutting wheel, Snips, or Heavy duty scissors
- Router or similar sanding wheel
- Elastic Webbing
- Rivets & Hammer
- White Electrical tape or similar
- Sticky Hook & Pile Velcro®

Initial Evaluation & Measurements

- Introduce yourself
- Describe the process they will go through & the Device



Evaluation

- Obtain a general Hx
- Confirm Dx & Rx
- Primary Cause of Enlarged Spleen
- Activity level as specified by Referring Dr.
- Allergies or other skin issues

Physical Exam

- Torso
- Margins
- Palpation
- Normal position



Examination of the Spleen



Dr. Saul Rosenberg, Stanford University Emeritus Professor

General Trim lines of Spleen Guard



- Extend just posterior of mid-axillary line of trunk
- Extend medially to naval
- Cover left 9th & 10th ribs and left ASIS
- Provide a margin of 5 cm past the edge of the spleen in all directions

Procedure for Low temperature plastics

- Can be done in one or two visits
 - Measure
 - Tracing & Pattern
 - Prepare plastic & Strap
-
- Prep patient for fitting
 - Heat & mold plastic
 - Assemble & Fit Guard

Procedure for Low temp Plastics

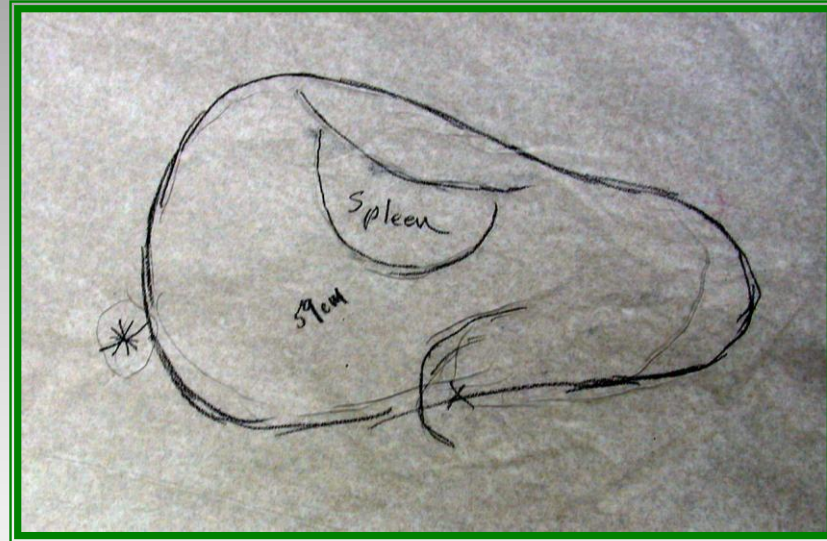


- Waist circumference

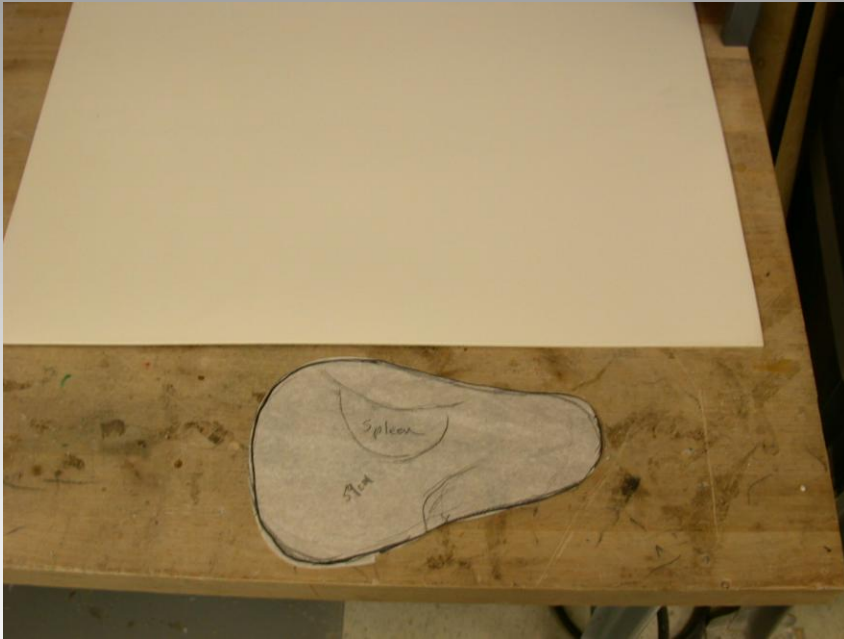
Tracing



Pattern



Prep Materials for patient fitting



Prep patient for fitting



How to create a relief for a G tube



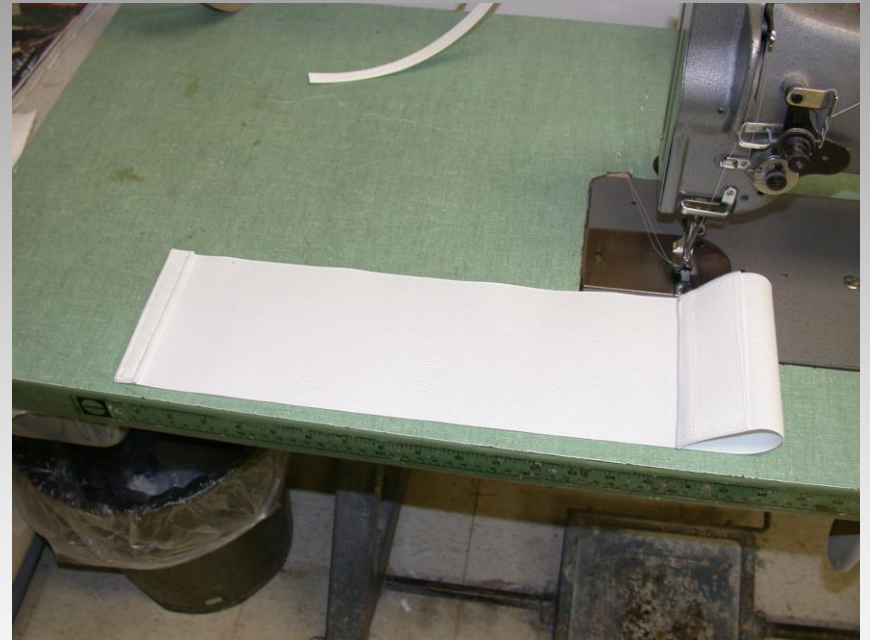
Heating Plastic



Mold plastic to patient



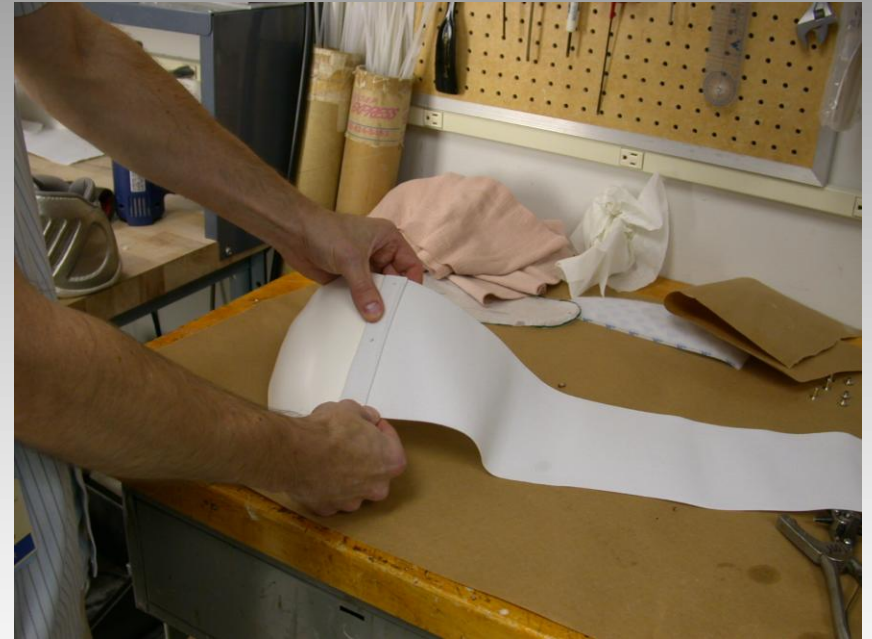
Elastic Strap



Remove Mold



Finishing



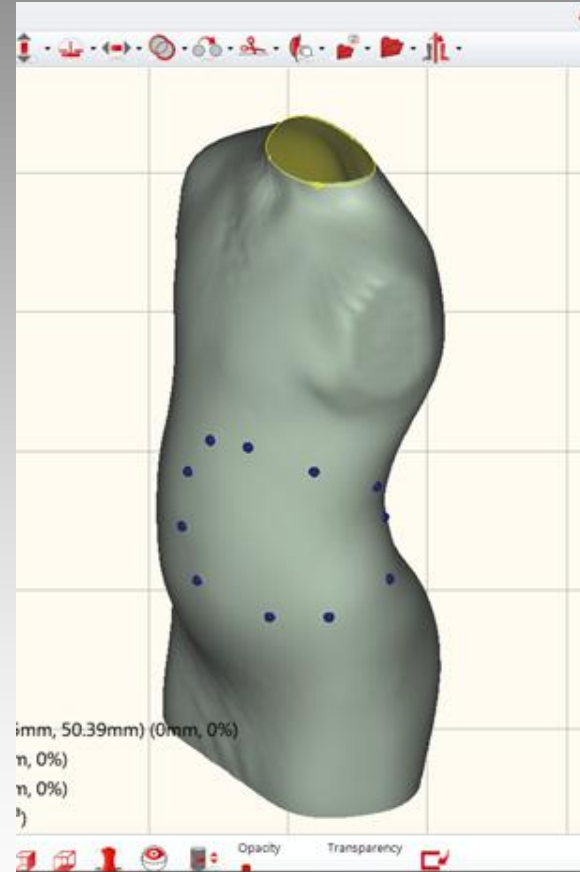
Final Fitting



Procedure for high temperature plastics

- Measure & scan patient
- Central Fabrication
 - Carves mold & vacuum forms plastic over mold
- Prep patient for fitting
- Assemble & fit guard

Procedure for high Temp plastics



Fabrication Procedures

Low Temperature

- 1 or 2 visit
- More in house fab.
- Less material & shipping cost

High Temperature

- 2 visits
- Less in house fab.
- Higher CF & shipping cost
- Allows for color / design

Guidelines

- Interface
- When should it be worn?
- Caution Statement
- Life of Device
- F/U
- Material Precautions
- Cleaning

Activity Level and Caution Statement

By David A. Piccoli, M.D.,
Chief, Division of Gastroenterology and Nutrition,
The Children's Hospital of Philadelphia

Dr. Piccoli "counsels" parents that high impact sports with the potential for injury are not a good idea.

"We cannot guarantee that these make every patient safe, every time," and "we cannot state absolutes for patients using spleen guards."

"These are designed to decrease risk, but common sense and appropriate care following abdominal trauma are always indicated."

Documentation & Evidence

- No scientifically controlled studies
- Empirical research
- Case Studies
- Anecdotal Evidence
- Limited Documentation as to the methods and or any specific criteria necessary in Fabrication of a device.

Splenic Rupture in Children With Portal Hypertension

Waisbourd-Zinman O, Shah A, Lin HC, Rand EB. Splenic Rupture in Children With Portal Hypertension. J Pediatr Gastroenterol Nutr. 2018 Mar;66(3):447-450. doi: 10.1097/MPG.0000000000001800. PMID: 29470319.

Take home points

- Splenic rupture in patients with PHTN is rare
- Reported cases were most commonly related to a fall
- Most hepatologists recommended against participating in sports (high impact sports) with a risk of blunt abdominal trauma.
- Spleen guards may be considered in activities with a risk of fall or blunt abdominal trauma.

Best practice recommendations / recommendations to reduce risk

- High impact contact sports should be avoided
- Spleen guard use in activities with a risk of falling or blunt abdominal trauma (sports requiring a helmet)

Facilitating sport participation with a customized spleen guard: a case of a basketball player with splenomegaly

Shah N, Richards D. Facilitating sport participation with a customized spleen guard: a case of a basketball player with splenomegaly. Clin J Sport Med. 2008 Jan;18(1):92-5. doi: 10.1097/JSM.0b013e31815889bc. PMID: 18185047.



Anecdotal Example

Dr. David Piccoli quote:

“Patients have sent me pictures of a bruised abdomen following trauma, most commonly a bicycle handlebar where the bruise is significant, but the bruise is located at the margins of the spleen protector rather than directly over the spleen, which was presumably the site of impact.”

Research idea

- Computational models used in automotive crash test simulations
- Biofidelic human models
- Could you use one of these models to assess the protective properties of a spleen guard?

Take home point

- Spleen guards allow children to gain a sense of normalization by allowing them to participate in more activities, and to develop socially
- Listen to your doctor

Thank you



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