

Severe Road Rash Abrasions Resulting in Edema, Inflammation, and Pain in Track Race Cycling Athlete: a Case Study

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An Amateur Track Cyclist in Switzerland
(a university student with a part-time job)

Case Study Overview



- Cyclist history
- History of trauma
- Treatment
- Introduction of new treatment modality
- Functional results

- 31-year-old Swiss amateur track cyclist
- Favored to win the 1000m and Sprint events at the 2006 National Track Cycling Championships of Switzerland
- Competition dates: June 21 – July 4, 2006





June 27 2006: Champion (center) in the 1000m race.



Ten minutes later, during the Scratch race, the cyclist collided with another participant, somersaulted, and skidded across the concrete velodrome.



The cyclist was treated at the venue by paramedics; his open wounds were cleansed and dressed. He fulfilled media obligations, then left the competition, unable to continue due to the pain.



Two hours after the fall, the cyclist arrived home and removed the already exudate-soaked conventional modern dressings the paramedics had applied.

The cyclist had severe road rash and localized swelling, especially in the shoulder girdle area, from the impact with the concrete.



He and a friend replaced all of the conventional modern dressings with polymeric membrane dressings which he requested from a friend.



Since the cyclist had less than a week to recover before the National Sprint competition, he needed more rapid healing of the abrasions, ecchymosis and edema than could be expected from experience with dressings used for previous injuries.

Using conventional modern wound care, the cyclist could expect limited range of motion and severe pain, which would inhibit training.

The athlete was willing to try a completely different dressing (a polymeric membrane dressing) to hasten his return to training and competition.



Polymeric membrane dressings possess several key integral components which enhance wound healing.

These components work together to concentrate healing substances from the body into the wound bed to promote rapid healing.



- Glycerol in the dressing prevents sticking and protects the periwound from maceration.
- Starch co-polymers give the dressings superior absorption, and
- A thin semi-permeable film backing optimizes moisture and protects the wound.
- A built-in wound cleanser facilitates autolytic debridement directly by loosening the bonds between the slough and the wound bed.



No manual wound cleansing is usually needed, allowing for less disruption of the new growth at the wound bed and very quick and easy dressing changes.

Dressing changes were easy enough for the athlete and his family or friends to do themselves.



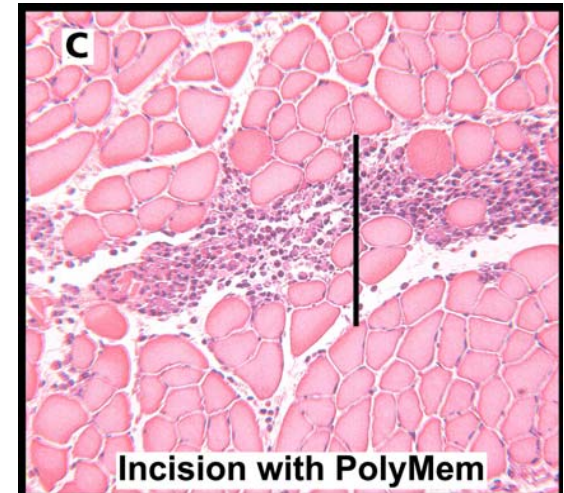
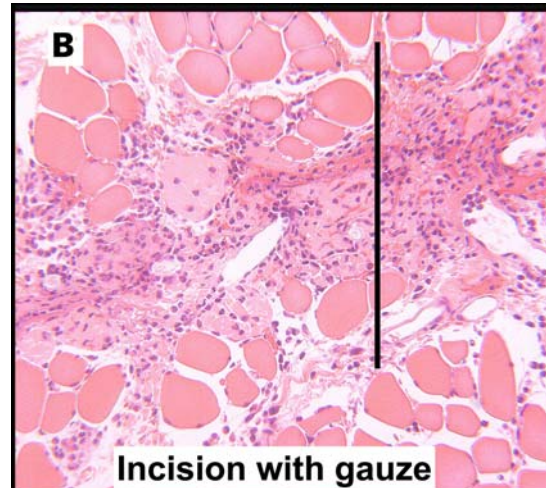
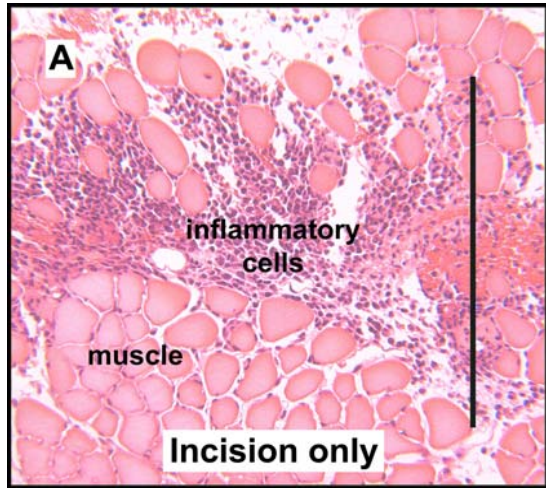
- Polymeric membrane dressings insulate the wound bed. This, coupled with the simple, rapid dressing changes helps maintain a steady warm temperature, further facilitating quick healing.
- Together the components also allow polymeric membrane dressings to hydrate the wound bed when needed.
- Additionally, the dressings help decrease pain and ecchymosis.



How does a dressing reduce pain?

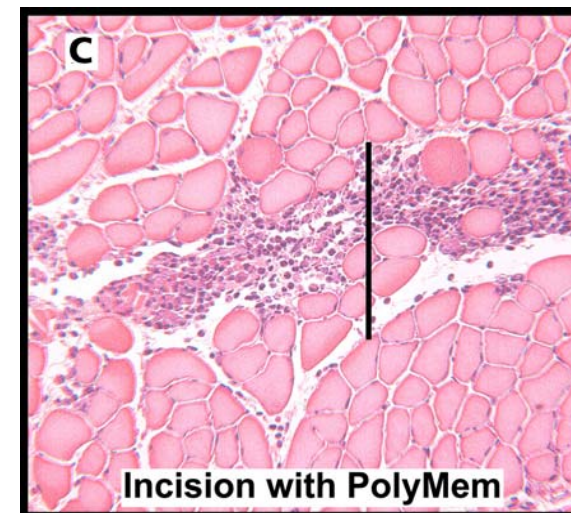
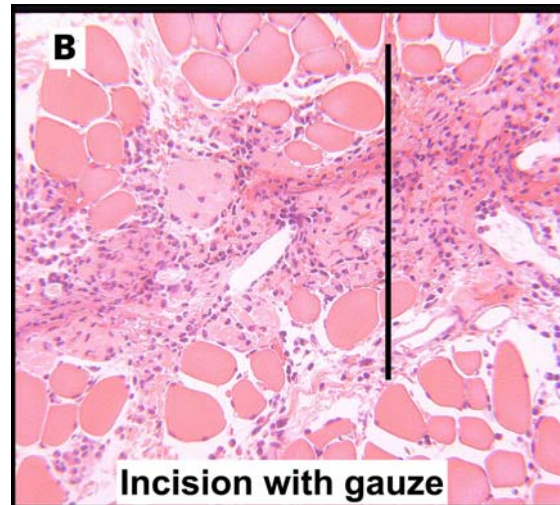
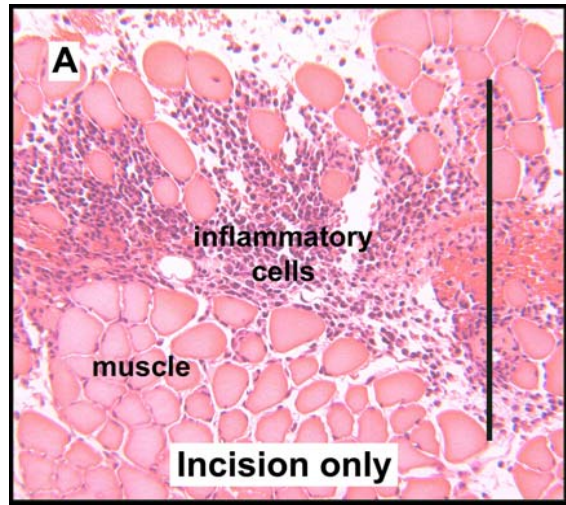
Polymeric membrane dressings inhibit the nociceptor response at the wound site. So, they not only help decrease pain, but also edema and inflammation-related ecchymosis.

An incisional study on a rodent model



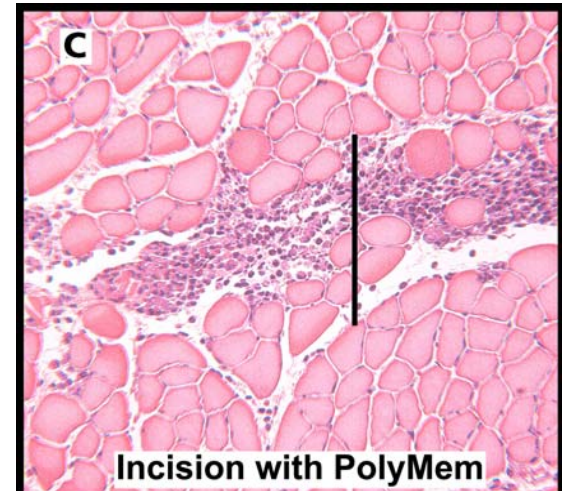
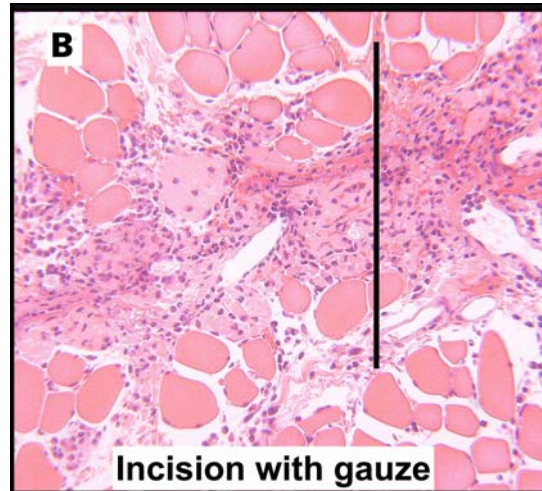
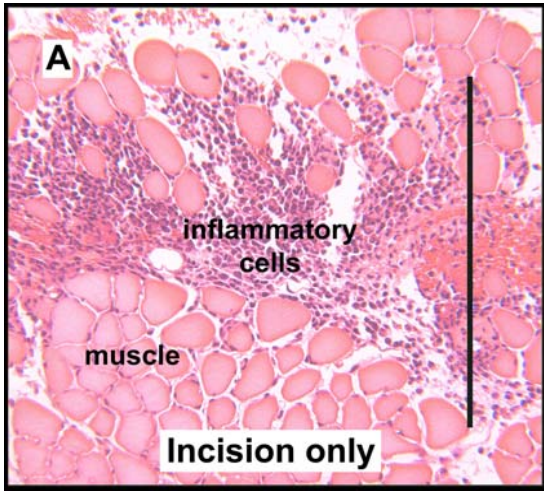
The vertical lines measure the extent of the inflammation, which is dramatically more localized with polymeric membrane dressings.

Polymeric membrane dressings help reduce the spread of the inflammatory reaction into surrounding, uninjured areas.



But there is no reduction in the robust localized inflammatory response required for healing the injury!

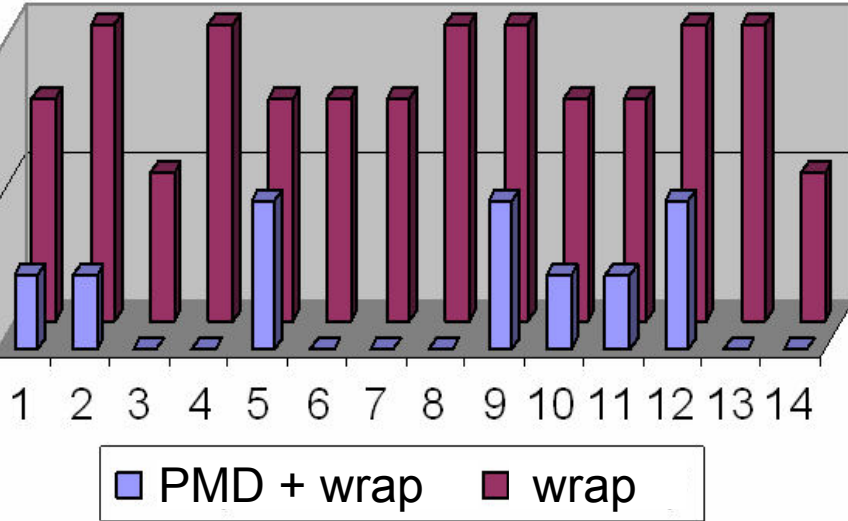
Suppressed inflammation



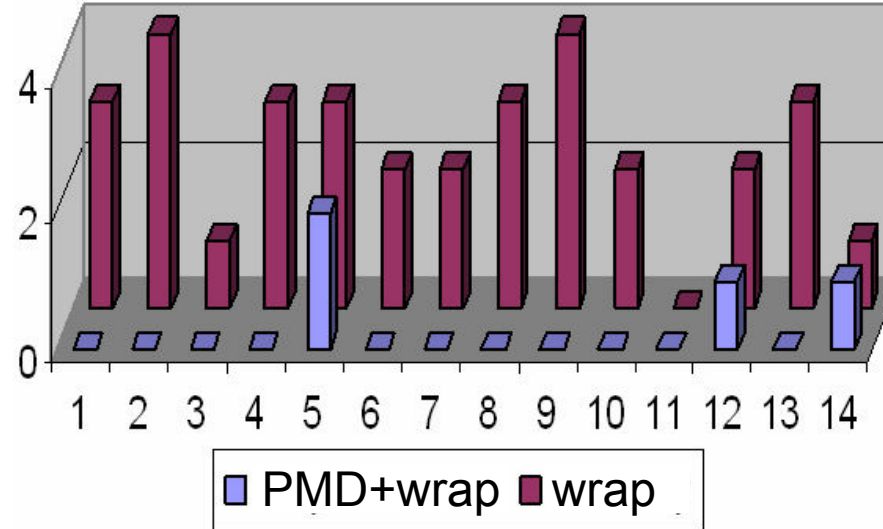
Suppression of the spread of the inflammation and swelling cascade into the surrounding, uninjured tissues helps accelerate the healing process.

Blunt trauma animal model

Swelling - 1 day post-injury



Swelling - 2 days post-injury



- Uniform blunt trauma to both legs on 14 anesthetized animals
- Polymeric membrane dressing plus a compression wrap applied to one leg
- Only the compression wrap was applied to the other leg
- Two independent observers evaluated swelling (0 – 4 scale)

Blunt trauma animal model

24 hours after injury



48 hours after injury

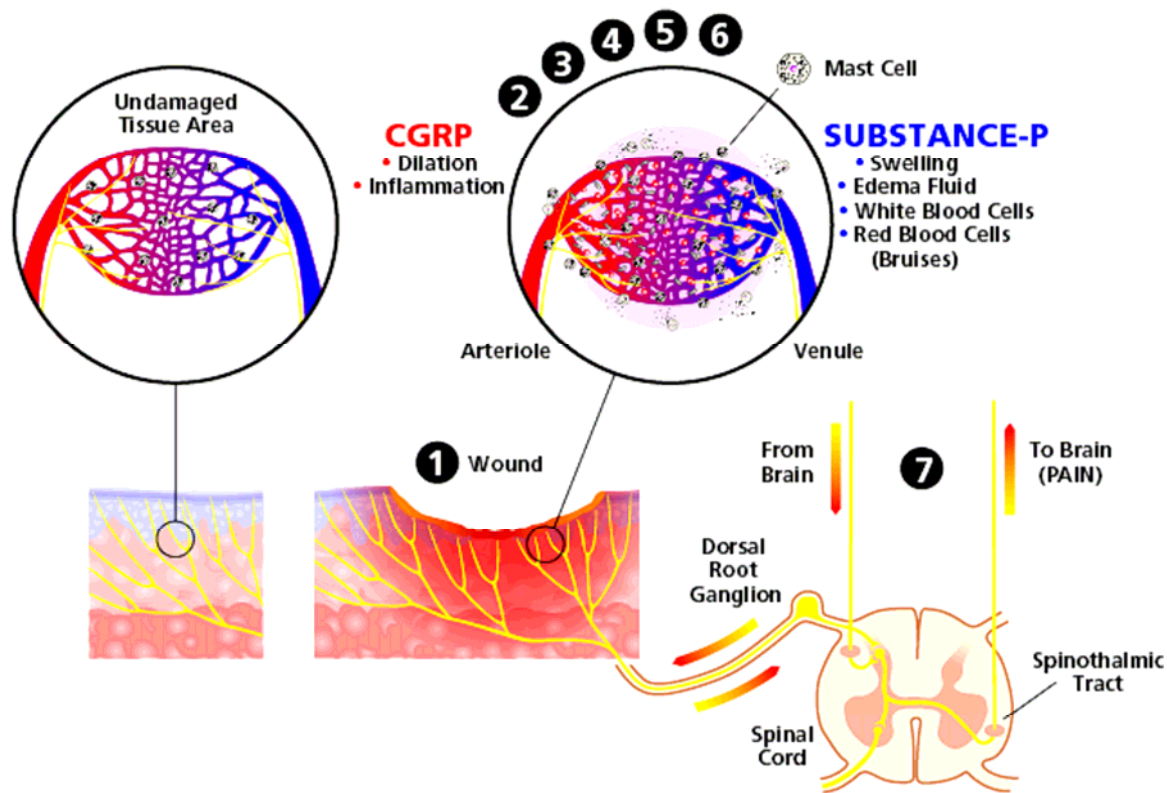


Leg on the left : wrap applied after uniform blunt trauma to both legs

Leg on the right : polymeric membrane dressing plus the wrap applied

Photos courtesy of Dr. Alan R. Kahn, University of Minnesota

Where is the polymeric membrane dressing acting?



The dressing acts locally, but it also affects the nociceptor response centrally. Topical application of the dressing significantly alters Fos expression.

How does it work?

Polymeric membrane dressings definitely reduce the nociceptor activity.

- Published evidence¹ states that the dressing might absorb sodium ions, by capillary action, from the skin and from the subcutaneous tissues.
- If this is true, then this local decrease in sodium ion concentration would result in reduced nociceptor nerve conduction, which could account for the observed pain relief and decreased ecchymosis.
- Therefore, dressings should be changed whenever they become saturated with sweat or wound fluid.

¹ Beitz AJ, Newman A, Kahn AR, Ruggles T, Eikmeier L. A polymeric membrane dressing with antinociceptive properties: analysis with a rodent model of stab wound secondary hyperalgesia. *J Pain*. 2004 Feb;5(1):38-47.



What about the cyclist?

Notice that when he applied the dressings that first night, he left out this less deeply wounded spot on the small of his back.

Wound healing, 1 day post injury



No edema or ecchymosis where polymeric membrane dressings were applied. But, edema and ecchymosis are significant where the dressing was not applied.



The athlete reported:

“To my great surprise, the initial swelling went down right away and there were no blue marks. I kept nearly all of my mobility. The next morning I could go to work... and was able to train at night. Where polymeric membrane dressings had been applied, I felt almost no discomfort. Only my right shoulder (without polymeric membrane dressings) hurt. Even the dressing changes I usually dreaded were simple and pain-free.”



The wound care was easy:

- The dressings were changed daily after training, due to saturation with sweat.
- Per dressing instructions, no additional wound cleansing was done at dressing changes.
- The cyclist was able to do the wound care himself with the help of a friend.
- The dressings are non-adherent. The cyclist reported that he did not experience pain at dressing changes – a pleasant surprise to him!



On day six, the cyclist competed in the semi-final qualification round for the Sprint championship with no complications.



On day seven, the cyclist competed for the Swiss Sprint championship.



Polymeric membrane dressings' drug-free formulation provides the following to injured athletes:

- ✓ Significant reduction in pain
- ✓ Significant reduction in the spread of the inflammatory reaction into the uninjured surrounding tissues
- ✓ Significant reduction in edema
- ✓ Significant reduction in ecchymosis
- ✓ Reduced injury healing time

The fans,
media, and
competitors
never
anticipated
such a rapid
recovery from
this amateur
cyclist



Athlete pictured in blue is a
professional competitor.



Day 7 post injury:
Sprint National Champion of Switzerland!

Once the abrasions were healed and he stopped using the polymeric membrane dressings, he became aware of the pain in his deep tissues.



When the reporters who follow the sport asked the cyclist how he was able to recover so quickly, he replied,

“I got back in shape so quickly only thanks to good care and a wound dressing that had been used successfully by the US athletes at Athens 2000, and that was provided for me by a cycling fan. The dressing prevented swelling and bruising without the use of medications.”

Schweizermeister im Sprint

An der auf der offenen Rennbahn Oerlikon stattfindenden Schweizermeisterschaft der Bahnradfahrer gelang es dem in Trübbach wohnhaften Patrik Merk seinen insgesamt zehnten Schweizermeistertitel zu gewinnen, den zweiten innerhalb einer Woche.

Rad. – Nur wenige Tage nach seinem Sturz im 1000m-Rennen sass Patrik Merk aus Trübbach erneut im Sattel, um für SM-Edelmetall zu spuren.



Drehen gemeinsam eine Ehrenrunde: Sieger Patrik Merk (links) und der Dritte Thomas Hauser.

Tolle Atmosphäre
Volle Publikums-Ränge, beste Stimmung, ausgezeichnete Wetterbedingungen und ein turbulenter Rennverlauf mit Disqualifikation und Stürzen kennzeichneten den zweiten Tag der Bahn-Schweizermeisterschaft in Oerlikon. Der Wartauer Patrik Merk war am Montagabend mit einer ansprechenden Leistung über 200 Meter mit fliegendem Start und einem ungefährdeten Sprintlauf im Viertelfinal über Erwartungen gut gestartet. Im Halbfinale am Dienstag traf Merk auf den ehemaligen BMX-Vizeweltmeister Hervé Krebs. Im ersten Lauf rutschte der Romand Krebs beim Versuch langsam durch die Steilkurve zu fahren gleich zweimal an

zweiten, diesmal ausgefahrenen Lauf dominierte Merk und qualifizierte sich damit für den Final.

Hitchcock-Finale
Im Final standen sich somit – wie bereits in den Vorjahren – Cédric Stoller und Patrik Merk gegenüber. Stoller, der Bahnsportprofi aus Ollon, der voll auf die Karte Sport setzt und mit der neuen Halle in Aigle über ausgezeichnete Trainingsmöglichkeiten in nächster Umgebung verfügt, galt als Titel-

Rennen als klarer Favorit. Den ersten Lauf entschied, der als engagiert und sehr angriff fahrend bekannte Cédric Stoller zu seinen Gunsten. Im zweiten Lauf attackierte Stoller erneut vehement, was zur Folge hatte, dass die Kurvenrichter auf unfaire, gefährliche Fahrweise entschieden und Stoller disqualifizierten. Somit wurde ein dritter und alles entscheidender Lauf nötig, die sogenannte «Belle». In diesem Lauf zeigte Merk grosse Nervenstärke und nutzte seine Erfahrung und

und seiner Medallensammlung vierten Schweizermeisterschaft Sprint hinzuzufügen. Dritter wurde Thomas Hauser und Vierter Hervé Krebs.

Ab in den Urlaub
Nach dem Gewinn von zwei Meistertiteln innerhalb einer Woche göss sich Merk nun verdient eine Pause. Erst wird zwar noch die Verletzung vom Sturz in der 1000m-Entscheidung auskuriert, dann die Abschlusprüfungen an der HTW Chur ab