

# The treatment of young children with heel injuries after implementation of a clinical pathway using a HydroBalance dressing

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## Introduction:

In the Netherlands parents use their bicycles as a mode of transportation for their toddlers. Accidents happen frequently (4400 cases/year (on average 12/day), causing very painful heel flap injuries, which often become infected (1). A clinical pathway was developed and implemented, to improve outcome of treatment for young children with spoke wheel heel injuries (Fig.1). The injuries may be graded into three classes: I-III, depending upon the severity and extent of the injury (2). Type I: Skin contusion and laceration, Type II: Skin and soft tissue defect with Achilles tendon exposure, Type III: Wide skin and soft tissue defect with the Achilles tendon defect and rupture. The management of spoke injuries is based on this classification (2). The treatment of type I injuries is typical cleansing and application of a moist wound healing dressing. A polyhexanide containing bio- cellulose\* dressing (HB + PHMB) was evaluated in a real life study in young children, looking at safety and clinical efficacy, pain reduction and handling of the dressing regime, using case ascertainment.

## Materials and methods:

For the study cleansing was done with iodine\*\*\* and rinsing with saline. HB + PHMB was applied, covered with a foam\*\* and fixed with a retention bandage. A cork splint is used to prevent pes equinus and to let the ankle joint rest. HB is a biosynthetic cellulose dressing, which has the ability to both donate and absorb moisture. (3,4) HB has been demonstrated to achieve faster healing and pain reduction than standard care with moist wound healing dressings (4-6). HB + PHMB (primary dressing) was left in place until epithelialization. During visits, the peri-wound skin was inspected and when required, the dressing was cut to fit the wound size. At the start of the study patients from the center were examined to determine general condition, associated factors, wound stage, and pain status. Wound inspection was During visits (day 0 and every three days for 14 days) the reduction in wound size, wound bed status, epithelialization, pain during dressing changes and occurrence of an infection, were evaluated. The patients were then followed up until wound closure.

N=20 young children (mean age was 5.69 years old (SD 1.33) that suffered from type I bicycle spoke injuries were recruited to the clinical evaluation.

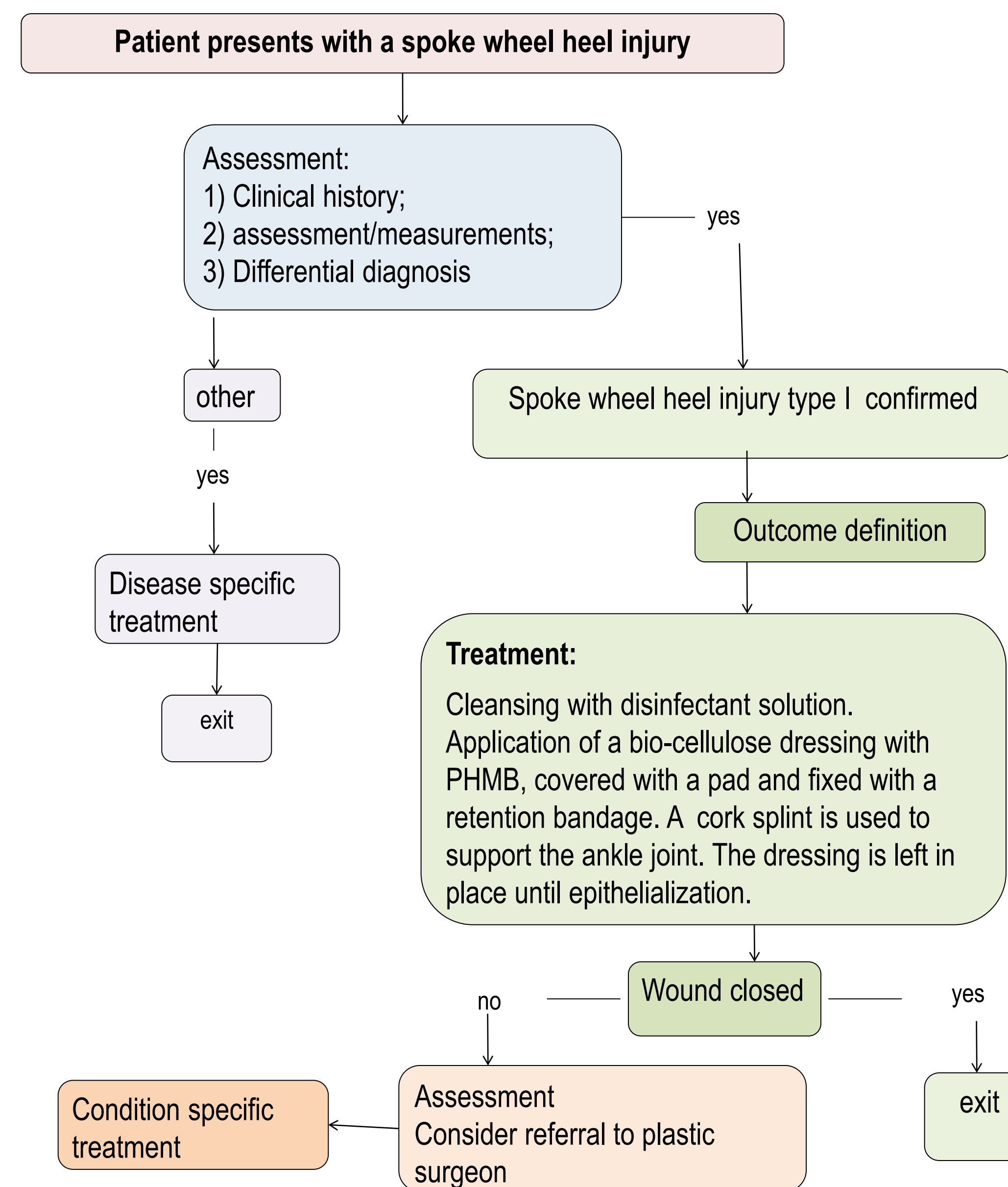


Fig 1: Clinical pathway for children with heel injuries

## Results :

N = 20 children were included in the analysis (11 male and 9 female). The mean wound size at the start of the treatment was 8.60 cm<sup>2</sup> (SD 6.57). Three patients had multiple wounds (n=2 had 2 wounds and (n=1) had 3 small wounds, very close together). The mean time to complete wound closure was 12.95 days (SD 7.69) with a total of visits of 4.70 (mean) (SD 1.56). Pain was assessed using a 10 point visual analog scale (VAS) adapted for children. Upon the start of the study mean pain score was 9.55 (VAS) (SD 0.69) and at the end this was significantly (p<0.003) reduced to 0.15 (VAS) (SD 0.37). The children and the parents were informed that the dressing would stay in place until it came off by itself, as the wound had epithelialized. At the second visit (after three days) n=17/20 reported to be free of pain. The parents reported to observe no anxiety or stress in their children for hospital visits. After three days the splint was removed and the children were allowed to walk. For details see figure 2 and 3.

## Conclusion :

HB + PHMB was shown to be safe. The treatment was effective, reducing time to healing, pain, dressing changes and number of visits. There were no infections noted. The children were less anxious as during the visits they did not experience pain. Wound healing was fast and child and parent friendly. The clinical pathway is now implemented in the hospital. Finally: Parents are advised to have appropriate spoke-guards installed, not dress guards, when ferrying kids about .

## References:

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Wound area is given in cm<sup>2</sup>. Time to ulcer closure is given in days (mean). For pain assessment a 10 point VAS, adapted for children was used, pain reduction was statistically significant (p<0.003).

The mean VAS (10 point scale) at day 0 was 9.55 (SD 0.69) at 14 days this was 0.15 (SD 0.37). Pain reduction was statistically significant (p<0.003)\*. The mean time to healing was 12.95 (SD 7.69) days. The mean number of visits was 4.70 (SD 1.56).

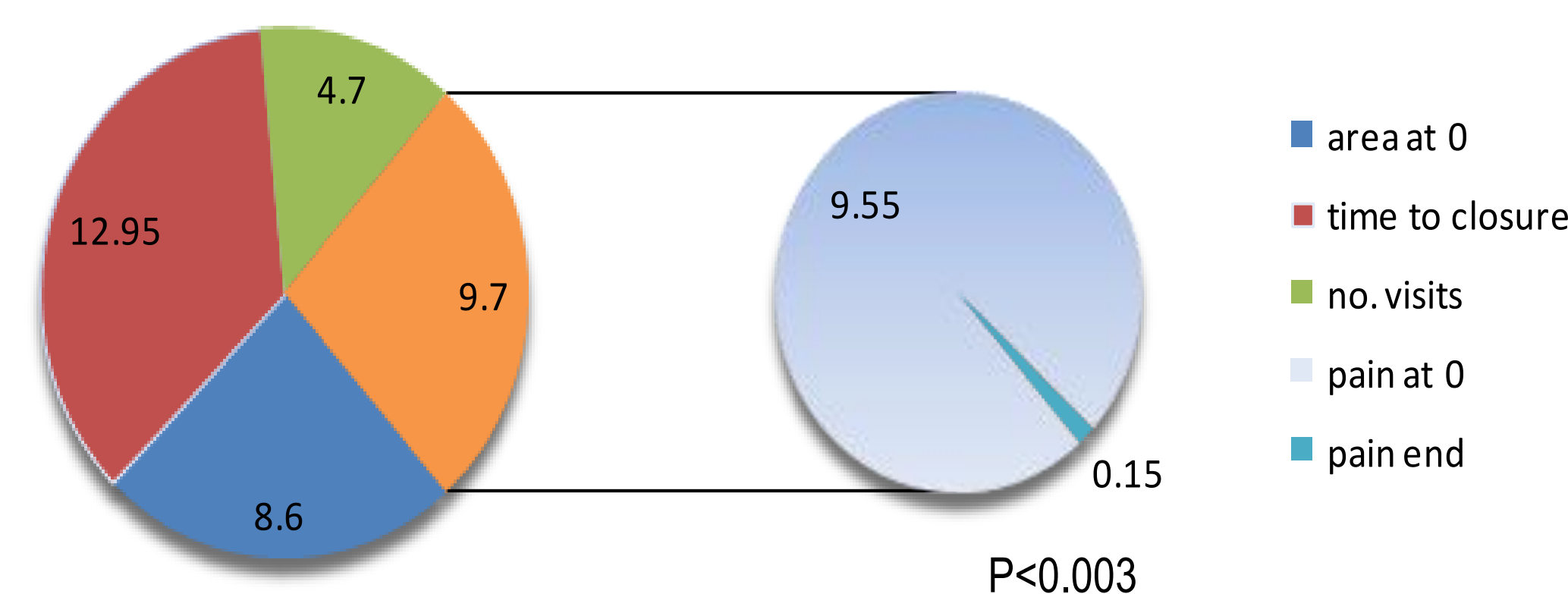


Fig. 2: Evolution of wound area and wound pain

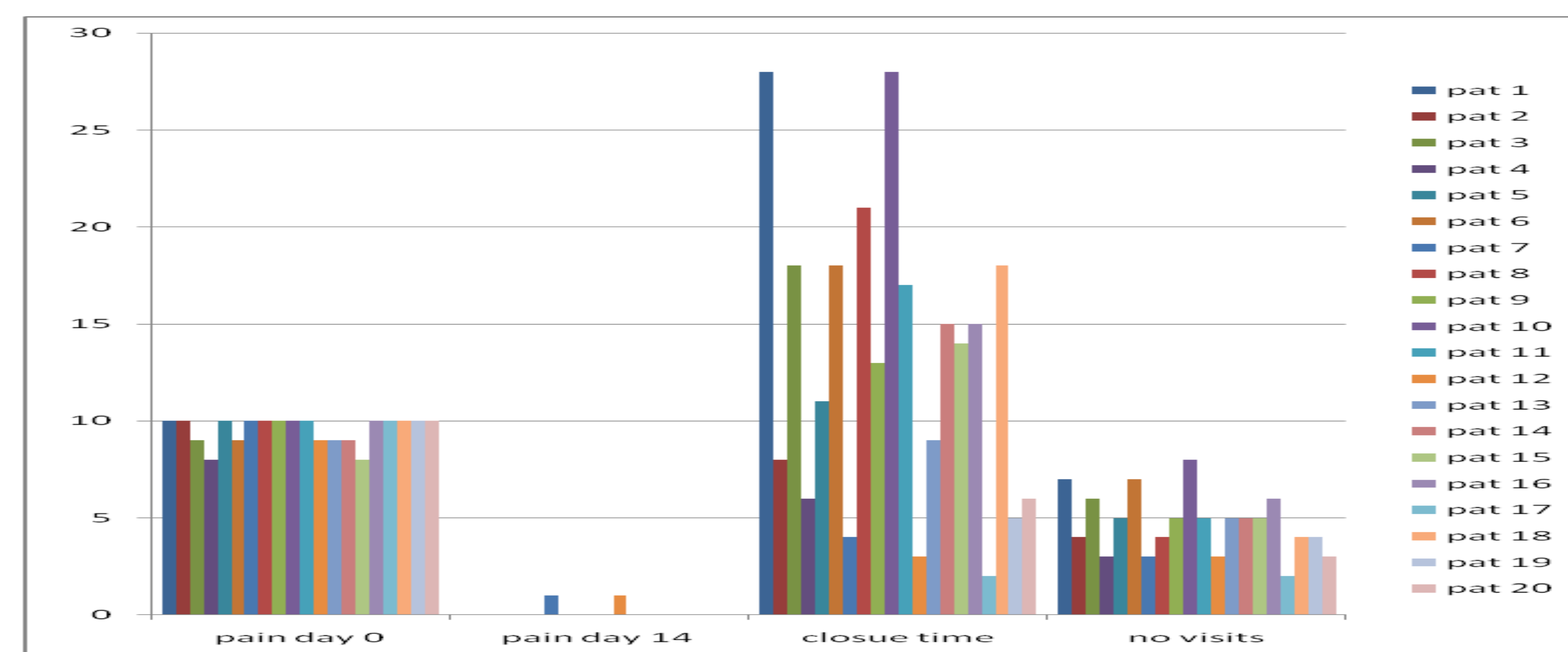


Fig. 3: Wound area and wound pain reduction per patient



Fig 2:

A typical case showing the situation post injury. The 5 year-old girl was injured while sitting on the bicycle with her mother. Wound size was 28 cm<sup>2</sup>, VAS 10. She was very upset and her mother was crying with her. After wound cleansing HB + PHMB was applied and she and her mother calmed down.



Fig 3:

Situation after 6 days of treatment. The patient reported no pain and was walking. Time to healing was 21 days and a total of 4 visits. During the visits she did not show anxiety as she understood the doctor was only inspecting her heel and not removing the dressing.

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\*Suprasorb® X + PHMB and \*\*Suprasorb® P: Lohmann & Rauscher GmbH, Rengsdorf, Germany  
\*\*\*Betadine® :Bbraun