

# Comparison of cast-associated pruritus prevention using calamine lotion and talcum powder: A randomized trial

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**Objective:** To compare the efficacy between calamine lotion and talcum powder in reducing pruritus in patients having distal radius fractures treated with short arm casts.

**Materials and methods:** Patients having a closed distal radius fracture without associated injuries aged 15-80 years visiting our emergency unit were randomized into talcum powder and calamine groups. All patients were treated by closed reduction and a short arm cast for four weeks. Atarax and paracetamol were prescribed for rescue medication. Patients were requested to report their pruritus score (0-10) daily in a supplied diary. The patients were followed up at one week for cast changing and then every week until cast removal. After cast removal, the skin condition was inspected for skin problems and the patients rated their satisfaction with the overall treatment.

**Result:** Thirty-four patients with distal radius fractures were randomized into talcum powder (19) and calamine (15) groups. The most common causes of fracture were fall and motor vehicle accident. No patient was lost to follow-up during the study period. Patients in the calamine group reported a significantly lower mean pruritus scores than those in the talcum powder group at the end of treatment period. There were no significant differences in the mean usage of rescue medication, complications, and satisfaction with treatment between the two groups.

**Conclusion:** Calamine lotion showed a better efficacy in reducing pruritus associated with casts than talcum powder in patients having distal radius fracture treated with short arm cast.

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Cast remains the standard retention treatment for fractures, especially upper extremity fractures<sup>(1)</sup>. However, there are various complications related to this type of retention including compartment syndrome, pressure sores, stiffness, and pruritus<sup>(2-5)</sup>. Despite being considered a minor complication, pruritus associated with a cast can disturb the patient's quality of life and in some instances result in premature cast removal or infection. One previous study found that significant pruritus during cast retention occurred in about 71% of cases<sup>(3)</sup>. Currently, the pathomechanism of pruritus during cast retention remains unknown. A number of factors such as humidity, irritants, or hypersensitivity have been postulated. Some studies have hypothesized that the histamine-release pathway can produce itching<sup>(5-9)</sup>.

In our current practice in Thailand, most orthopedists apply talcum powder before affixing the cast to try to prevent pruritus. Calamine lotion is another potential candidate to reduce this

problem due to its coolness and antihistamine effect. However, there have been no previous studies evaluating the efficacy of calamine lotion in reducing pruritus associated with casts. The objective of this study was to compare the efficacy of talcum powder vs. calamine lotion in reducing pruritus associated with casts.

## Material and Method

This study was approved by the Ethics Committee of the Faculty of Medicine, Prince of Songkla University. Informed consent was obtained from all patients before the study. Patients aged between 15-80 years visiting the Emergency Department of our institution with closed fracture of the distal radius from June 2008 to June 2009 were included in this study. Simple randomization using opaque envelope was used to randomize the patients into two groups: those given talcum powder and those given calamine lotion to reduce pruritus.

All patients were treated with closed reduction and a short arm cast by the on-call senior resident. After the reduction, the skin was cleaned with 70% alcohol, and either talcum powder (15

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grams) or calamine lotion (15 ml) was applied before cast application. All patients were informed about cast care and requested to report the level of pruritus (0-10) daily in the diary, which was provided for them. All patients received Atarax and paracetamol for use as rescue medication. The patients were followed up at the second week for cast changing and then every week until cast removal. When the cast was removed, the skin condition was inspected by the same senior resident, and the patient was asked to rate his or her satisfaction with the overall result of treatment.

### Statistical analysis

Descriptive analysis was used to evaluate the demographic characteristics. Paired t-test was used to compare mean pruritus scores between the groups at different time points. Chi-Square was tested for all categorical outcomes.

### Results

There were 34 patients included in the study. The most common causes of injuries were fall and motorcycle accidents. Left side injuries were more common than right side injuries. Bending and compression were the most common mechanisms of injury according to Fernandez's classification (Table 1).

**Table 1.** Patient characteristics of both groups

| Variable                   | Calamine lotion group | Talcum powder group |
|----------------------------|-----------------------|---------------------|
| Number of patients         | 15                    | 19                  |
| Mean age (SD), years       | 40.0 (22.8)           | 34.5 (23.2)         |
| Sex: male / female         | 8:7                   | 13:6                |
| Causes of injury (%)       |                       |                     |
| Fall                       | 8 (53.3)              | 9 (47.3)            |
| Motorcycle accident        | 7 (46.7)              | 10 (52.7)           |
| Side of injury             |                       |                     |
| Right                      | 4 (26.7)              | 9 (47.4)            |
| Left                       | 11 (73.3)             | 10 (52.6)           |
| Fernandez's classification |                       |                     |
| I                          | 8 (53.3)              | 3 (15.8)            |
| II                         | 7 (46.7)              | 13 (68.4)           |
| III                        | -                     | 3 (15.8)            |

Both groups demonstrated significant improvement in mean pruritus scores after cast application. However, the improvement was sustained only in the calamine group, and not in the talcum powder group.

Despite the significantly greater mean initial pruritus score in the calamine group, their mean pruritus score improved to a level comparable to the talcum group at Days 1 and 21. Furthermore, the calamine group showed a significantly better mean pruritus score than the talcum powder group at Day 28 after cast application (Table 3). However, there was no

significant difference in mean usage of rescue medication between both groups.

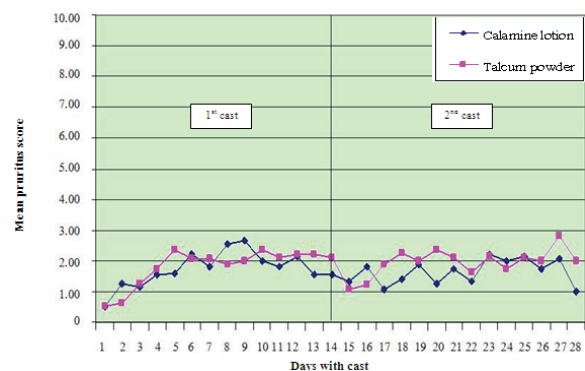
**Table 2.** Comparison of mean pruritus score (SD) at the initial time point with different time points after application of the cast.

| Time point<br>Group | 1 <sup>st</sup> cast |           |           | 2 <sup>nd</sup> cast |           |
|---------------------|----------------------|-----------|-----------|----------------------|-----------|
|                     | Day 1                | Day 7     | Day 14    | Day 21               | Day 28    |
| Calamine lotion     | 0.5 (1.4)            | (1.7) 1.8 | 1.5 (2.1) | 1.7 (1.8)            | 1.0 (1.2) |
| P-value             | -                    | 0.003     | 0.008     | 0.002                | <0.001    |
| Talcum powder       | 0.5 (0.9)            | 2.1 (1.5) | 2.1 (3.1) | 2.1 (3.2)            | 2.0 (7.1) |
| P-value             | -                    | 0.248     | 0.188     | 0.425                | 0.164     |

**Table 3.** Comparison of mean pruritus scores and mean usage of rescue medication (SD) between the groups

| Pruritus score                  | Calamine lotion | Talcum powder | P-value |
|---------------------------------|-----------------|---------------|---------|
| Day 1                           | 0.5 (1.4)       | 0.5 (0.9)     | 0.985   |
| Day 7                           | 1.8 (1.7)       | 2.1 (1.5)     | 0.645   |
| Day 14                          | (2.1) 1.5       | 2.1 (1.3)     | 0.340   |
| Day 21                          | 1.7 (1.6)       | 2.1 (2.3)     | 0.595   |
| Day 28                          | 1.0 (1.2)       | 2.0 (1.7)     | 0.030*  |
| Mean usage of rescue medication | 1.9 (4.8)       | 1.3 (3.8)     | 0.677   |

The mean pruritus scores of both groups tended to increase with the length of time they had the cast (Fig. 1). At the time of second cast removal, no patients had any skin problems or complications related to either calamine or talcum powder use and all patients indicated satisfaction with the overall results of their treatment.



**Fig. 1** Mean pruritus scores of calamine lotion and talcum powder groups at various time points.

## Discussion

This study found that calamine lotion was more effective than talcum powder for pruritus prevention in patients having distal radius fracture treated with a cast. In addition, there were no major side effects during cast treatment in either group. All patients were satisfied with the overall results of their treatments.

The pathogenesis of pruritus from cast treatment remains obscure. However, there is some evidence that histamine may be the mediator of the pruritus pathway<sup>(10)</sup>. Factors associated with the pathomechanism include humidity, local irritants, and allergy. Every patient has the area under the cast covered with Webril before the short arm cast is applied in order to minimize exposure from plaster of Paris. However, humidity especially from sweating can aggravate the pathogenesis of pruritus.

This might explain the efficacy of both talcum powder and calamine lotion, because both can minimize the effects of humidity and local skin irritants in patient treated with cast. The sustained efficacy of calamine lotion at 1 month, which was significantly better than talcum powder, might be related to zinc oxide in calamine lotion, a substance with a bactericidal effect, which, even though weak, may control local skin irritations<sup>(11-14)</sup>.

Although pruritus is a common complaint among patients treated with casts, no previous study has attempted to evaluate this problem or suggest management strategies, possible because this is normally regarded as a minor problem. In addition, modern treatments are moving in the direction of more surgical approaches such as internal fixation rather than casts. Another factor may be the climate difference between Eastern and Western countries, as sweating inside a cast is more likely in tropical countries such as Thailand than in cooler climate. Such sweating can increase humidity under the cast and provoke the pruritus pathway.

Up to the best of our knowledge, our study is the first study to evaluate preventive measures for this problem. Our results are useful in assisting physicians to treat patients with casts, and they also provide preliminary result which can be the basis for further study.

The study has some limitations. First, the number of patients in this study was limited, so there was only a low power for detecting differences between both groups. Second, we had no control group, so we cannot conclude that either treatment was better than doing nothing. Third, we included only patients with distal radius fractures treated with short arm casts. The results cannot be generalized to other types of casts. Further studies should be done with a larger number of patients and other types of cast with a control group.

In conclusion, however, we feel our results are strong enough to recommend applying calamine

lotion before the application of a plaster of Paris cast as a useful measure to reduce the incidence of pruritus.

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## การศึกษาระดับของครอสลิงค์เอ็นเทโลเปปไทด์ของคอลลาเจนชนิดที่หนึ่งในปัสสาวะ ของสตรีไทยวัยเจริญพันธุ์และวัยหมดระดู

ชานินทร์ บุญตั้งใจ, พบ., บุญสิน ตั้งตระกูลวนิช, พบ.

**จุดประสงค์:** เพื่อเปรียบเทียบประสิทธิผลการป้องกันอาการคันจากการใส่ฝือกระหว่างแปรงฟันและคาทาไมน์โลชั่นในผู้ป่วยกระดูกเรเดียสส่วนปลายหักที่รักษาด้วยการใส่ฝือกแขนสั้น

**วัสดุและวิธีการ:** ผู้ป่วยกระดูกเรเดียสส่วนปลายหักอายุระหว่าง 15 ถึง 80 ปีที่เข้ารักษาที่แผนกฉุกเฉิน รพ.สงขลานครินทร์ ได้รับเชิญเข้าร่วมการศึกษา แบ่งผู้ป่วยเป็น 2 กลุ่มโดยวิธีสุ่มได้แก่ แปรงฟัน และคาทาไมน์โลชั่น ก่อนทำการรักษาโดยการจัดเรียงกระดูกและใส่ฝือกแขนสั้นประมาณ 4 สัปดาห์ ผู้ป่วยทุกคนได้รับยาแก้ปวดและยาลดอาการคันกลับบ้าน แพทย์นัดติดตามการรักษา สัปดาห์ที่ 1, 2 และ 4 ผู้ป่วยได้รับหนังสือบันทึกอาการคัน โดยผู้ป่วยรายงานระดับอาการคัน (คะแนน 0-10) ทุกวันขณะใส่ฝือก แพทย์ตรวจสอบสภาพผิวหนังบริเวณใต้ฝือกเมื่อผู้ป่วยได้รับการถอดฝือก และผู้ป่วยประเมินระดับความพึงพอใจผลการรักษาเมื่อสิ้นสุดการรักษา

**ผลการศึกษา:** มีผู้ป่วย เข้าร่วมในการศึกษานี้ 34 ราย โดย 19 รายอยู่ในกลุ่มแปรงฟันและ 15 รายอยู่ในกลุ่มคาทาไมน์โลชั่น สาเหตุของอุบัติเหตุส่วนใหญ่เกิดจากการหกล้มหรืออุบัติเหตุมอเตอร์ไซค์ ไม่มีผู้ป่วยรายใดขาดการติดตามในการศึกษา ผลคะแนนเฉลี่ยระดับอาการคันของผู้ป่วยทั้ง 2 กลุ่มดีขึ้นหลังได้รับการทาแปรงฟันและคาทาไมน์โลชั่น แต่ระดับคะแนนความคันเฉลี่ยของผู้ป่วยกลุ่มคาทาไมน์โลชั่นดีกว่ากลุ่มแปรงฟันอย่างมีนัยสำคัญทางสถิติที่วันที่ 28 หลังการรักษา อย่างไรก็ตาม ปริมาณการใช้ยาเพื่อลดอาการคันและความพึงพอใจต่อการรักษาทั้งสองกลุ่มไม่แตกต่างกันอย่างมีนัยสำคัญทางสถิติ

**สรุป:** คาทาไมน์โลชั่นป้องกันอาการคันได้ดีกว่าแปรงฟันในผู้ป่วยกระดูกเรเดียสส่วนปลายหักที่ได้รับการรักษาด้วยฝือกแขนสั้น