Supplementary file 4 (text)

Quantitative Sensory Testing
Quantitative sensory testing (QST) is a graded, standardized activation of the sensory system either by chemical, electrical, mechanical or thermal stimuli, with quantitative assessment of the evoked psychophysical response. In research, the detection thresholds, pain thresholds, and supra-threshold stimuli are used in characterization of neurological sensory deficits. These assessments are compared to values from the contralateral groin area or a specified control site: either the contralateral groin area or the lower arm.

The test area in the pathological groin area was delineated and centered at the point of maximum palpatory pain intensity at the superficial inguinal ring and mirrored on the contralateral side. The testing areas were indicated with a marker on the skin and covered 12.5 cm² (2.5 x 5.0 cm²) corresponding to the area of the computerized thermode. An anatomic drawing of the test areas is presented in Supplementary file 3. Prior to the assessments hair growth in the areas was removed using a surgical hair trimmer (Surgical Clipper 9681, 3M Healthcare, MN, U.S.A.). Detailed overviews of the QST-methods used in the present study have been reported previously [1, 2, 3].

Tactile thresholds
The tactile detection threshold (TDT) and tactile pain threshold (TPT) were assessed using calibrated polyamide monofilaments (Stoelting, IL, U.S.A.; nominal buckling forces ranging from 0.04 to 4,400 mN) applying Dixon’s up-and-down method [4]. The subject was instructed immediately to verbally indicate tactile recognition and the median value (TDT) using three sequences of alternating descending and ascending stimuli, were registered. The TPT was assessed accordingly using the median value of pain threshold perception.

Thermal thresholds
Warmth detection threshold (WDT), cool detection threshold (CDT), heat pain threshold (HPT) and cold pain threshold (CPT) were assessed by a computerized thermode based system (Thermotest, Somedic AB, Sweden) with a contact area of 12.5 cm². The method-of-limits method was used [5]. The thresholds were determined from a baseline temperature of 32°C with a ramp rate of ± 1°C/s. Cut-offs for heat and cold were 50°C and 5°C, respectively. Values exceeding cut-offs were designated as 51°C and 4°C, respectively. The subject indicated by a handheld button device
immediately, when the appropriate stimulus was recognized (detection threshold) and when the stimulus was perceived as pain (pain threshold).

**Temporal summation**

Temporal summation was tested by the dynamical and static responses to stimulation by brush (2-3 cm/s; 4-5 cm stimulation path; 0.3 Hz) and polyamide monofilaments (0.5 Hz), respectively. The subjects were told to report the pain intensity (NRS) every 15 s during a 60 s stimulation. A positive temporal summation phenomenon (‘wind-up’-correlate) was indicated when a NRS-score > 2 was obtained comparing the pathological groin area with the control side. Aftersensations were reported and the pain/discomfort were rated (NRS) for the following 60 s.

**Suprathreshold heat stimulus**

Suprathreshold heat stimulus were applied by the contact thermode system. The test started at a baseline temperature of 32°C with a ramp rate of ±1°C until a plateau of 47°C was maintained for 5 s. The subject was told to report the pain intensity (NRS) during the short phasic heat stimulus.

**Pressure algometry**

In order to assess pain from deep tissues, an electronic handheld pressure algometer (Somedic AB, Sweden) with a felt-tipped probe of 1.0 cm² was applied perpendicularly to the skin, corresponding to the superficial inguinal ring. The cut-off limit was 350 kPa, and the pressure was applied with an increasing rate of 20-30 kPa/s. The subject was instructed to immediately indicate by a handheld button device when pain was perceived, indicating the pressure pain threshold (PPT). The test was repeated three times, and the mean value was used in the calculations. Values exceeding cut-offs were designated as 351 kPa, and the median of the three assessments were used.

**REFERENCES**