Hypnotic glove anaesthesia: Effects of hypnosis on skin temperature measured by infrared thermography

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Background and Goal of Study

We investigated the effects of hypnotic glove anaesthesia on skin temperature measured by thermography in healthy volunteers.

Materials and methods

After IRB approval (CPP Sud-Est L16-187) and written informed consent, 30 healthy volunteers were recruited. Subjects sat comfortably with both forearms, wrists and hand lying flat on a wooden table, under the thermal infrared cameraused (Optris Infrared thermometer PI 160, Berlin Germany). The camera sample frequency was set at 2 Hz (i.e. 2 images.sec-I) and eleven areas of temperature recording were defined. Each area was a circle of 5 mm of diameter, in whom the temperature was automatically computed as the mean of temperatures of the total number of pixels comprised within the 5 mm diameter circle. These 11 areas were defined as described on table 1.

Table 1 : Definition of the eleven area of skin temperature measurement

	Control side	Glove side
hand	Area 1 and 2	Area 6 and 7
wrist	Area 3	Area 8
forearm	Area ' and 5	Area 9 aand 10
	Between forearms	
	Area 11	

After 20 min temperature equilibration the first measure of skin temperature was recorded (TI) among the eleven areas of temperature recording. Then the first painful stimulus (PI) was applied by pinching the webbing between the thumb and index finger of the non-dominant hand. Pain intensity was assessed on a 0-10 (0 = no pain, 10 = maximal pain imaginable) numerical rating scale (NRS). The second measure of skin temperature was performed 10 minutes later. Between T1 and T2, subjects were just waiting. Immediately after T2, the investigator began the suggestions and the subject was invited to "built" his or her own analgesic glove over the nondominant hand. The third temperature measure was performed after the hypnotic analgesic glove had been finished and the subjects declared been fully protected (T3). At this point, the second painful stimulus was applied at the same level as the first one (P2) and was rated by the subject on the NRS scale for pain. Then, the investigator invited the subject to remove its glove and to store it in a safe place and keep it ready for an ulterior use. When the subject felt that the glove was totally removed and had recovered normal sensations within his or her hand, the fourth measure of skin temperature was performed (T4) prior to the last painful stimulus to check that all analgesia protection had been withdrawn (P3). Then, the subject was asked to remain five more minutes motionless before le last measure of skin temperature (T5) that corresponded to the end of the protocol. (Fig. 1) Creation of the analges¹ The absolute difference in temperature between both regions during time T1 to T5 was compared using ANOVA for repeated measures. Pain intensity Removing of the analgesic glo from PI to P3 was compared using ANOVA. A value of p < 0.05was considered as statistically P3 painful stimu significant.

Results and discussion

There was a significant difference in the absolute temperatures up to 0.5 °C during time between the hand and wrist wearing the hypnotic glove and the control hand (Fig. 2A and 2B). This difference was not observed on the forearm (Fig. 2C). The hypnotic glove provided a significant decrease in NRS pain scores at P2 (Fig. 3).

Conclusions

Hypnotic glove anaesthesia provides significant changes in skin temperature accompanied by a 50% reduction in pain intensity in the hand and wrist but not in the forearm. Further study is required to determine the mechanisms of these objective changes induced by hypnosis.

Fig. 2: Evolution of temperature over time









