

ORIGINAL RESEARCH

Unmyelinated Tactile Cutaneous Nerves Signal Erotic Sensations

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ABSTRACT

Introduction. Intrapersonal touch is a powerful tool for communicating emotions and can among many things evoke feelings of eroticism and sexual arousal. The peripheral neural mechanisms of erotic touch signaling have been less studied. C tactile afferents (unmyelinated low-threshold mechanoreceptors), known to underpin pleasant aspects of touch processing, have been posited to play an important role.

Method. In two studies, we investigated the relationship between C tactile activation and the perception of erotic and pleasant touch, using tactile brushing stimulation. In total, 66 healthy subjects (37 women, age range 19–51 years) were examined. In study 1 (n = 20), five different stroking velocities were applied to the forearm and the inner thigh. The participants answered questions about partnership, mood, and touch. In study 2 (n = 46), the same five stroking velocities were applied to the forearm. The participants answered questions about partnership, touch, and sexuality.

Results. Both touch eroticism and pleasantness were rated significantly higher for C tactile optimal velocities compared with suboptimal velocities. No difference was found between the ratings of the thigh and the forearm. The velocity-dependent rating curves of pleasantness, intensity, and eroticism differed from each other. Pleasantness was best explained by a quadratic fit, intensity by a linear fit, and eroticism by both. A linear transformation of pleasantness and intensity predicted the observed eroticism ratings reliably. Eroticism ratings were negatively correlated with length of relationship.

Conclusion. Touch was rated most erotic when perceived as pleasant and weak. In human hairy skin, perception of pleasantness is correlated with the firing rate of C tactile afferents, and perception of intensity is correlated with the firing rate of A β afferents. Accordingly, eroticism may be perceived most readily for touch stimuli that induce high activity in C tactile fibers and low activity in A β fibers. **Jönsson EH, Backlund Wasling H, Wagnbeck V, Dimitriadis M, Georgiadis JR, Olausson H, and Croy I. Unmyelinated tactile cutaneous nerves signal erotic sensations. J Sex Med 2015;12:1338–1345.**

Key Words. C Tactile; Touch; Erotic; Somatosensory; Pleasantness; Periphery

Introduction

Touch, delivered in the right way, by the right person and under the right circumstances can be a powerful sexual incentive, i.e., it can elicit motivated behavior aimed at sexual activity, or feelings of sexual desire, arousal or pleasure. Such

“erotic touch” include for example caressing, massaging and static touch [1]. Conversely, dysfunctional or altered touch perception is associated with sexual problems like hyposexual desire disorder [2]. Yet, despite the beneficial effects of erotic touch and bodily intimacy on relationship quality and individual happiness [1], it is still largely

unknown how somatosensory stimuli may give rise to sexual feelings.

Touch is communicated through mechanoreceptors in the peripheral nervous system that innervates the skin. These divide into two large groups: myelinated, fast conducting A fibers and unmyelinated, slowly conducting C tactile fibers. C tactile fibers, a subgroup of the C fibers, are found only in hairy skin and respond optimally to slow stroking stimulation with a velocity of 1–10 cm/s, to light force, and to temperatures of about 32°C—a stimulation that resembles interpersonal touch [3–6]. Additionally, C tactile firing correlates highly with subjective pleasantness ratings of touch. This has led to the “social touch hypothesis,” stating that C tactile fibers are specifically tuned to respond to comforting interpersonal touch [4]. Interpersonal touch has the ability to communicate a wide range of emotions, from disgust to love [7].

In addition to pleasant or social touch, C tactile fibers are suggested to be mediators of erotic touch [8]. This idea is to some extent supported by observations in patients who are relieved from excruciating chronic pain by surgical transection of the spinothalamic tract (anterolateral cordotomy [9]). Postoperatively, these patients report no erotic cutaneous sensation on the lesioned side [9]. As C tactile fibers probably projects together with the nociceptors and thus are affected by the transection, this suggests that C tactile signaling is necessary for erotic touch sensation. However, the potential involvement of C tactile afferents in erotic touch perception has, to the best of our knowledge, not been specifically examined. The aim of this study was to investigate a potential correlation between stimulation of C tactile fibers and erotic perception.

If C tactile fibers are involved in the peripheral coding of somatosensory sexual incentives, C tactile optimal stroking touch with a velocity of 1–10 cm/s is expected to be perceived as more erotic compared with C tactile suboptimal touch. This hypothesis was tested in two studies. Study 1 compared eroticism ratings of C tactile optimal (1, 3, and 10 cm/s) and suboptimal brushing (0.3 and 30 cm/s) on two body sites (forearm and inner thigh). Study 2 aimed to replicate the results from study 1 on the forearm and additionally tested if eroticism ratings to C tactile optimal brushing are related to sexual behavior in daily life. The forearm was chosen based on previous studies on C tactile-related perception [3,10,11], and the inner thigh was chosen based on high self-rated erotic touch perception [12].

Aim

We aimed to investigate the relationship between C tactile afferent stimulation and erotic touch perception in healthy adults.

Main Outcome Measures

Ratings of eroticism, pleasantness, and intensity of touch stimuli of different velocities were obtained from all participants.

Study 1

Methods

Ethical Declaration

The investigations were performed according to the Declaration of Helsinki on Biomedical Research Involving Human Subjects. The protocol was approved by the ethics committee in Gothenburg, Sweden. Following explanation of the study, written informed consent was obtained from all participants.

Participants

Twenty healthy volunteers (age 19–33 years [mean 23.5 ± 3.2 years standard deviation, SD], 10 women) participated. Most of them were undergraduate students and considered themselves to be healthy. The volunteers were paid for their participation.

Procedure

Questionnaires. The participants answered the Multidimensional Mood State Questionnaire (MDMQ [13]) and the Social Touch Questionnaire (STQ [14]), both translated to Swedish, before starting the experiment. The MDMQ consists of 30 items asking about current mood on the dimensions good–bad, awake–tired, and calm–nervous. The STQ consists of 20 items asking about attitudes toward interpersonal touch.

Presentation of Touch Stimuli. Two skin sites were stimulated: the left inner thigh and the left dorsal forearm. The participants wore shorts and were seated in a comfortable chair in front of a computer screen with their left arm in prone position on a pillow. The touch stimuli were applied by a custom-built robotic device (rotary tactile stimulator, RTS; Dancer Design, St. Helens, UK), using a 50-mm wide, flat soft watercolor brush made of fine, smooth goat’s hair. The robotic device was controlled through LabVIEW (National Instruments, Austin, TX, USA). The touch was applied

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