

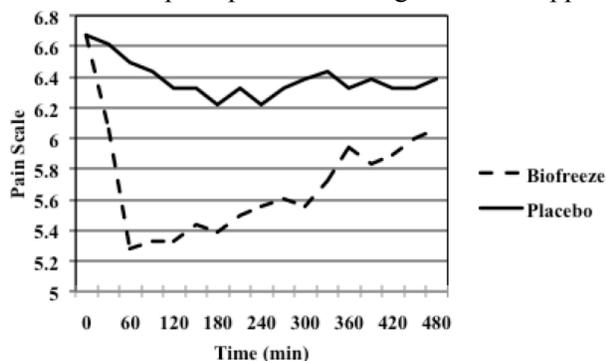
Lasting effects of Biofreeze on pain relief in sedentary young men and women with delayed-onset muscle soreness (DOMS)

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Pain and discomfort in muscle is very common 24 hr after engaging in resistance training. This condition is known as Delayed-Onset Muscle Soreness (DOMS) and is related to an inflammatory response to microtrauma inflicted upon the muscle when producing high levels of force. This inflammatory response produces swelling within the muscle cells that contributes to the soreness. **Purpose:** To establish how long Biofreeze may reduce pain associated with DOMS. **Method:** Sedentary young males (n=3) and females (n=6) (age = 23.9 yr; wt = 70.1 kg; ht = 156 cm) were recruited from undergraduate Human Performance Studies classes at Wichita State University. Participants were instructed to refrain from heavy exercise and consuming or applying any type of anti-inflammatory medication 24 hr before the 1-RM test and throughout duration of the study. After determining 1-RM, participants performed 10 sets of 10 repetitions of barbell back squats at 60% of their 1RM to elicit DOMS. Squats were performed to a predetermined depth using stacked 5-cm spacers so that the femurs were parallel to the floor at the end phase of the eccentric portion. Participants were required to touch the top of the stack during each squat repetition. At 24 hr after the exercise session, Biofreeze was applied (1ml of gel for every 200 cm² of surface area) to one quadriceps muscle group and the same dose of Biofreeze placebo was applied to the other quadriceps. Application was randomized to each leg and participants were blinded to the identity of the application. Prior to gel application, participants rated the level of pain in each leg using a scale ranging from 0 (no pain) to 10 (pain as bad as it could be). Following application, participants completed this rating scale every 30 min for 8 hr. **Results:** Pain was reported to be exactly the same for both legs at 24 hr (6.67 - severe pain). After application of Biofreeze, pain declined ($p<0.05$) to a minimum at 60 min (pain rating = 5.28; 21% decline) that was classified as moderate pain. Although pain tended to increase with Biofreeze after 1 hr, pain remained less ($p<0.05$) than placebo for 5 hr.

Table 1. Pain perception following Biofreeze application



Conclusions: Biofreeze reduces DOMS-related pain by ~20% 60 min after application in sedentary adults and then a lower plateau of pain perception is achieved for 5 hr following application. Our previous study with recreational athletes who had lower ($p<0.05$) initial levels of pain (4.65) 24 hr after exercise also reported maximum pain relief at 1 hr after Biofreeze application. Although they demonstrated a 31% relative decline in pain 1 hr, their absolute scores on the pain scale declined similarly (1.4 points) compared to the current study. Further research is needed to determine whether declines in pain can be attained in less time and/or if a greater decline can be achieved. This could lead to the development of a longer lasting, faster acting, and more effective product. **Application:** These results provide an understanding regarding the efficacy of Biofreeze to reduce pain associated with DOMS that will benefit those who work with athletes, athletes themselves, whether recreational, amateur, or professional, as well as the general population, many of who suffer from DOMS following physical activity that is unfamiliar (e.g., raking, digging, construction work).