New Study Supports the Benefits of Adding Flexall 454® to Therapeutic Ultrasound

A 25% Flexall 454® to 75% ultrasound gel mixture provides results equal to 100% ultrasound gel.

"When subjects came in for the second treatment, several stated that their leg felt warm all night where the ultrasound was applied…all had received the mixture of Flexall and ultrasound gel…."

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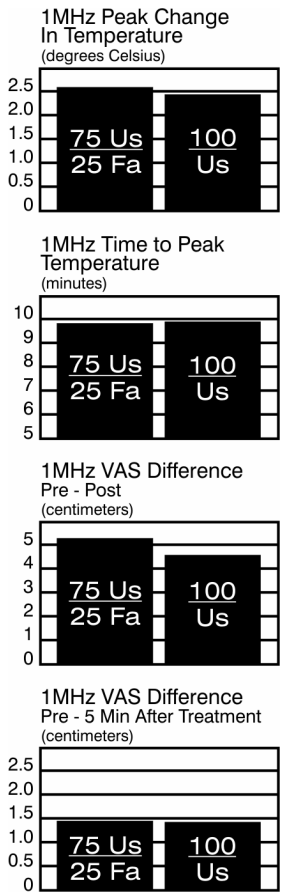
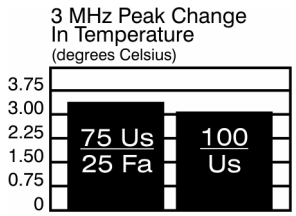


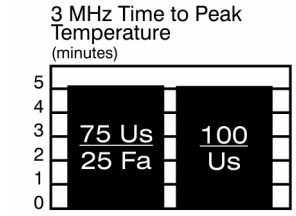
Abstract. A mixture of 25% Flexall 454® and 75% ultrasound gel is as good of a couplant as 100% ultrasound gel, based upon intramuscular temperature rise.

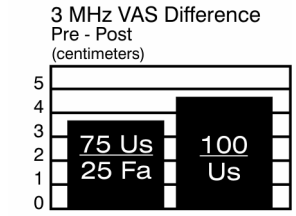
Objective. This study focused on the addition of Flexall 454® to the ultrasound coupling gel Aquasonic® 100, in order to enhance the benefits of therapeutic ultrasound. A 25/75% mixture of Flexall® and Aquasonic® 100 ultrasound gel, respectively, was compared with 100% Aquasonic® 100 in order to determine whether the addition of Flexall® alters the peak change in temperature and time to peak temperature. This study also attempted to record perception of thermal sensation between the mixture and the 100% gel.

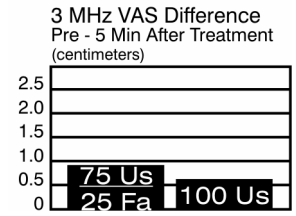
Subjects. 25 college-age subjects (mean age = 22.40 ± 1.71, mean skin fold = 6.72 ± 3.04) participated in this study. The subjects were randomly placed into either a 3 MHz (n = 15) or a 1 MHz (n = 10) treatment group.

Measurements. Intramuscular tissue temperatures were recorded via one thermistor needle inserted into the left triceps surae muscle at a depth of 2 cm for the 3 MHz group or 4 cm for the 1 MHz group. The subjects received two ultrasound treatments (Omnisound 3000E, Accelerated Care Plus, Reno, NV) during which the rise in intramuscular temperature was recorded every 30 seconds using a 16-channel Isothermex (Columbus Instruments, model 256, Columbus, OH). One treatment used the 25/75% mixture as a coupling agent and the other used 100% Aquasonic® 100 ultrasound gel. The subjects also recorded any feelings of thermal sensation prior to, upon completion, and five minutes after each treatment on a modified visual analog scale (mVAS).









Statistics. We used repeated measures ANCOVAs to determine the differences between the two coupling agents in reference to peak change in temperature and the mVAS. A repeated measures ANOVA was used to determine the difference in the rate of intramuscular temperature rise.

Results. The 3 MHz group presented with peak changes of 3.32ºC ± 0.24°C for the 25/75% mixture and 3.06ºC ± 0.24ºC for the 100% Aquasonic? 100 at a depth of 2 cm. Time to peak temperature differences were 5.07 ± 0.09 min and 5.03 ± 0.09 min for the mixture and the 100% gel, respectively. The pre to post mVAS scores for the 3 MHz group was 3.74 ± 0.69 cm and 4.76 ± 0.69cm for the mixture and the 100% gel, respectively. The scores for the 5 minute follow-up mVAS were 0.93 ± 0.32mm for the mixture and 0.59 ± 0.32mm for the 100% gel. The 1 MHz group demonstrated peak temperatures of 2.53 ± 0.25ºC, and 2.49 ± 0.25ºC for the mixture and the 100% gel, respectively. Time to peak temperature differences were 9.90 ± 0.12min for the mixture and 9.95 ±0.12min for the 100% gel. The pre to post mVAS scores for the 1 MHz group were 5.28 ± 0.60cm and 4.57 ± 0.60cm for the mixture and the 100% gel, respectively. The scores for the 5 minute follow-up mVAS were 1.49 ± 0.46cm for the mixture and 1.43 ± 0.46cm for the 100% gel. We found no significant difference between the 25/75% mixture and the 100% gel for peak change, time to peak, or the mVAS for both the 3 MHz and the 1 MHz treatment groups (p= .05).

Conclusion. A mixture of 25/75% Flexall® and Aquasonic® 100 ultrasound gel provides equivalent results for peak change in temperature, time to peak temperature, and perception of thermal sensation (during and 5 minutes after treatment) as 100% Aquasonic® 100 ultrasound gel. Note: We only measured subject's perceived heat during and five minutes after the session.

When subjects came in for the second treatment, several stated that their leg felt warm all night where the ultrasound was applied. When we checked these subject's files, all had received the mixture of Flexall® and ultrasound gel the previous time.

Therefore, when a sensation of warmth (with its analgesic effects) is warranted along with actual deep heating, a mixture of 25% Flexall® and 75% ultrasound gel is the medium of choice.