

EFFECT OF FOUR DIFFERENT GLOVES ON MAXIMAL GRIP FORCE OF SUGAR CANE CUTTERS



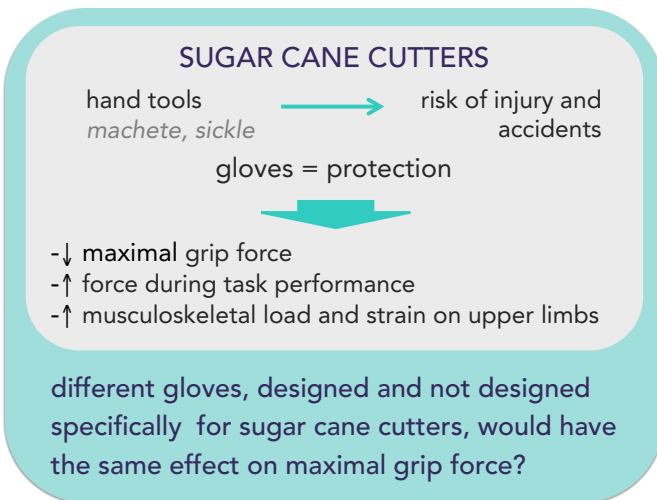
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Introduction



Objective

To evaluate the effect of four different gloves on grip force of sugar cane cutters.

Methods

Subjects

- 23 right-handed subjects (17 men and 6 women) were randomly selected among 857 workers from a sugar and alcohol plant located in Sao Paulo State/Brazil
- mean age of 30.13 ± 6.39 years
- they had no musculoskeletal symptom in upper limbs (body map - Corlett and Bishop, 1976)

Grip Force Measurement

- grip force was recorded using an analogical dynamometer
- workers were placed on seats, elbow at 90° of flexion, wrist and forearm at neutral position
- familiarization of the procedure with 2 trials
- test was based on three repetitions – mean values were used as reference

Data Analysis

- Shapiro Wilk's and Levene's test to evaluate normality and homogeneity, respectively
- data were compared through ANOVA one-way and Tukey test (post-hoc analysis)
- alfa level was set at 0.05

Results

- the four gloves caused a significant reduction in maximal grip force of sugar cane cutters (Figure 1)

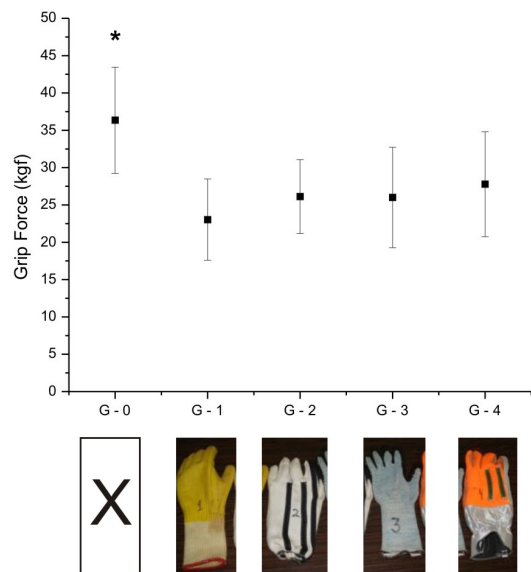


Figure 1 | Mean values and standard deviations for grip force recorded in 5 different conditions: G-0 (no glove), G-1 (glove model #1), G-2 (glove model #2), G-3 (glove model #3), G-4 (glove model #4). Asterisks (*) indicates $P < 0.05$ for the post-hoc analysis (Tukey test) when comparing G-0 with the other conditions.

- despite the tested gloves had different designs and materials, there was no difference in the grip force produced when workers were wearing them
- the mean reduction in grip force was 29.19%:
 - G-1 | -36.60%;
 - G-2 | -28.11%;
 - G-3 | -28.47%;
 - G-4 | -23.56%.

Conclusions

- although different models of glove are available and were specially designed for sugar cane cutters, they seem to have the same effect on grip force;
- to generate the same power, forearm muscles have to produce higher effort → musculoskeletal strain;
- gloves = protection of workers against mechanical risks (cuts produced by the machete and sugar cane leaves);
- there is still the need for a glove that causes a lower reduction in grip force in order to reduce strain on upper limbs of sugar cane cutters.



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