# A double-blind, randomized, placebo-controlled crossover trial of medical cannabis in adults with Tourette syndrome

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**Background:**
The number of effective pharmacological options for the treatment of tics is limited. A substantial proportion of patients do not respond adequately to currently available medications or experience significant adverse effects. Emerging evidence shows cannabinoids as promising for the treatment of tics. We set out to compare the efficacy and tolerability of single doses of three vaporized medical cannabis products and placebo in reducing tics in adults with Tourette syndrome (TS).

**Methods:**
In a randomized, double-blind, crossover design, each participant received a vaporized single 0.25 g dose of THC 10%, THC/CBD 9%/9%, CBD 13% and placebo at two-week intervals. Our primary outcome was the Modified Rush Video-Based Tic Rating Scale (MRVTRS), taken at baseline and at 0.5, 1, 2, 3, and 5 hours after dose administration. Secondary measures included the Premonitory Urge for Tics Scale (PUTS), Subjective Units of Distress Scale (SUDS), and CGI-I. Correlations between outcomes and cannabinoid plasma levels were calculated. Tolerability measures included open-ended and specific questions about adverse events (AEs).

**Results and Conclusions:**
Twelve adult patients with TS were randomized (11 males, mean age 28.7 years, range 15-44), with 9 completing the study. There was no statistically significant effect of product on the MRVTRS. However, there was a significant effect of THC 10%, and to a lesser extent THC/CBD 9%9%, versus placebo on the PUTS, SUDS, and CGI-I. As well, there were significant correlations between plasma levels of THC and its metabolites, but not CBD, with MRVTRS, PUTS and SUDS measures. There were more AEs from all cannabis products relative to placebo, and more from AEs from THC 10% versus other cannabis products, particularly cognitive and psychomotor effects. Most participants correctly identified whether they had received cannabis or placebo. In this randomized controlled trial of cannabis for tics in TS, there was no statistically significant difference on the MRVTRS for any of the cannabis products, though the THC 10% product was significantly better than placebo on the secondary outcome measures. As well, THC and metabolite plasma levels correlated with improvement on all measures. The THC 10% product resulted in the most AEs. This pilot data will inform the design of a larger chronic treatment clinical trial to characterize the efficacy and safety of medical cannabis in TS.