

PENTOXIFYLLINE RAPIDLY ENHANCES SPERM MOTILITY UNDER SIMPLE-WASH CONDITIONS: IMPLICATIONS FOR INTRAUTERINE INSEMINATION SUCCESS

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BACKGROUND & OBJECTIVE

- Progressive motility (PM) is a key predictor of intrauterine insemination (IUI) success
- Pentoxifylline (PTX) improves motility in density-gradient-selected sperm
- PTX effects under simple-wash conditions remain unclear
- Enhancing motility at insemination may improve IUI effectiveness and reduce IVF need
- To evaluate the dose- and time-dependent effects of PTX on PM under simple-wash conditions

METHODS

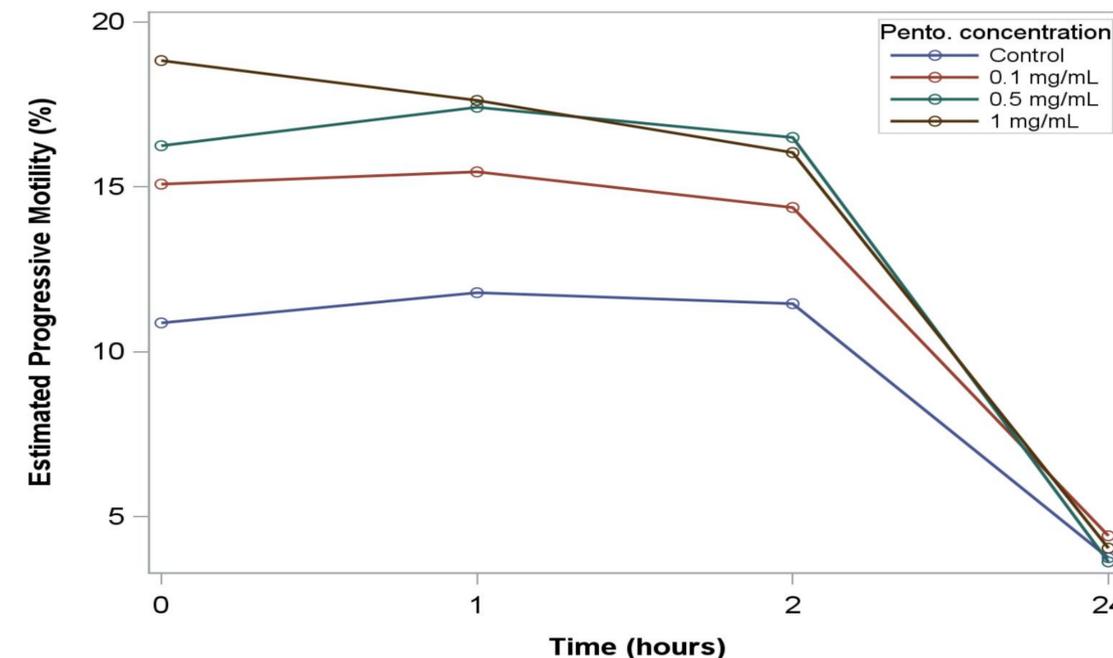
- n=24 men with asthenozoospermia (<30% PM, WHO 6th ed.)
- Semen divided into 4 aliquots: control 0 mg/mL, PTX 0.1, 0.5, 1.0 mg/mL
- Simple-wash protocol: 3× HEPES-HSA overlay; centrifugation 10 min at 1,120 rpm; reconstitution in 0.4 mL MHM-C + gentamicin
- PM (%) measured by CASA at 0, 1, 2, and 24 h at 37°C
- Linear mixed-effects model tested dose, time, and dosetime interaction
- Tukey-Kramer adjustment for dose vs control at each timepoint ($\alpha=0.05$); analyses in SAS v9.4

RESULTS

Table 1: Change in Progressive Motility (Δ PM %) Compared With Control

PTX Dose (mg/mL)	0 h	1 h	2 h	24 h
0.1	4.2 (-1.6 to 10.0) $p = 0.46$	3.7 (-2.4 to 9.8) $p = 0.76$	2.9 (-2.5 to 8.3) $p = 0.88$	0.7 (-2.7 to 4.0) $p = 1.00$
0.5	5.4 (-0.4 to 11.2) $p = 0.10$	5.6 (-0.5 to 11.7) $p = 0.11$	5.0 (-0.4 to 10.4) $p = 0.096$	0.1 (-3.5 to 3.2) $p = 1.0$
1.0	8.0 (2.2 to 13.8) $p = 0.0005$	5.8 (-0.3 to 11.9) $p = 0.077$	4.6 (-0.8 to 10.0) $p = 0.20$	0.3 (-3.1 to 3.6) $p = 1.00$

Fig. 1. Estimated mean PM (%) in PTX-treated groups with different concentration doses and control group at different time points



RESULTS

- Significant dose effect ($p = 0.0004$), time effect ($p < 0.0001$), and dosetime interaction ($p = 0.0071$)
- 1.0 mg/mL significantly increased PM at 0 h vs control (+8.0%, 95% CI 2.2–13.8; $p = 0.0005$)
- Effects diminished by 24 hours

CONCLUSION

- PTX produces a rapid, dose-dependent increase in PM under simple-wash conditions
- The effect is greatest immediately after processing and diminishes by 24 hours
- These findings support further clinical evaluation of peri-insemination PTX use in IUI

CLINICAL IMPLICATIONS

- A short-acting motility boost may be most effective when administered immediately prior to insemination
- These data inform protocol design for the Pentoxifylline's Role in Improving Sperm Motility (PRISM) pilot randomized controlled trial in IUI evaluating pregnancy and live birth outcomes