

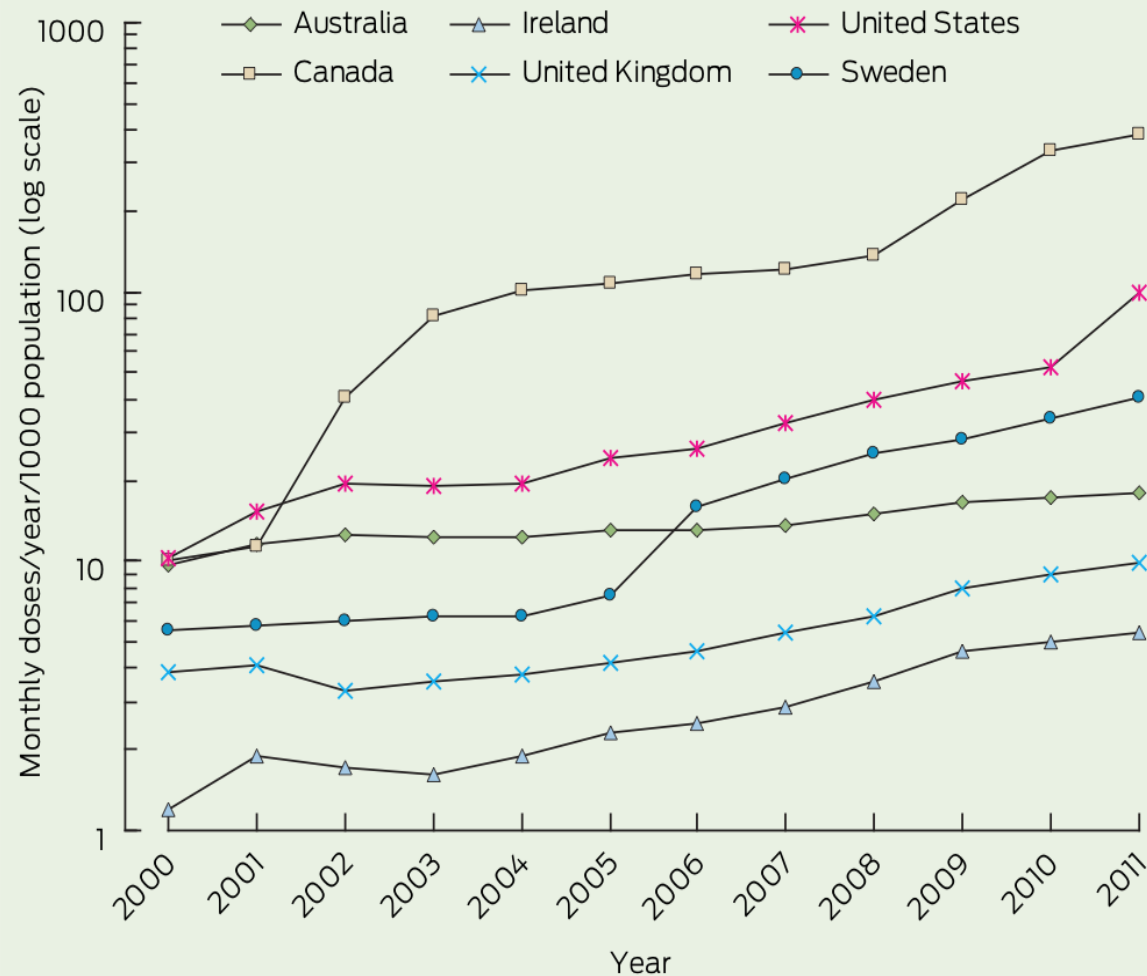
USE OF A NOVEL SUBCUTANEOUS  
NEEDLE-FREE TECHNIQUE TO DELIVER  
TESTOSTERONE IN HYPOGONADAL MEN.



**JEFF B. MAROTTE, MD, FACS**

# Male Hypogonadism & Testosterone Therapy

2 Increasing testosterone use, 2000–2011, in selected countries



Handelsman DJ: *Global trends in testosterone prescribing, 2000-2011: expanding the spectrum of prescription drug misuse.* The Medical Journal of Australia 2013, 199(8):548-551.

## Currently Available Modalities



- Testosterone Undecanoate Injection (Aveed™)
- Buccal, bioadhesive testosterone tablets (Striant™)
- Implantable subcutaneous pellets (Testopel™)
- Intranasal administration (Natesto™)
- Transdermal gel (Androgel™, Testim™)
- Transdermal patches  
(Androderm™, Testoderm™)

# Is there a better mouse trap?



# Objectives



**1. To conduct the first ever proof-of-concept study to assess the potential of a needle-free injector to consistently self-administer and deliver testosterone in a safe and effective manner.**

**2. To evaluate the efficacy (defined as testosterone serum levels, injection site wetness, pain, and patient response to clinical questionnaire) of self administered, needle-free injection of testosterone cypionate as a modality for TRT.**

# Bioject® ZetaJet™



ZetaJet: Spring mechanism injects medication subcutaneously or intramuscularly.

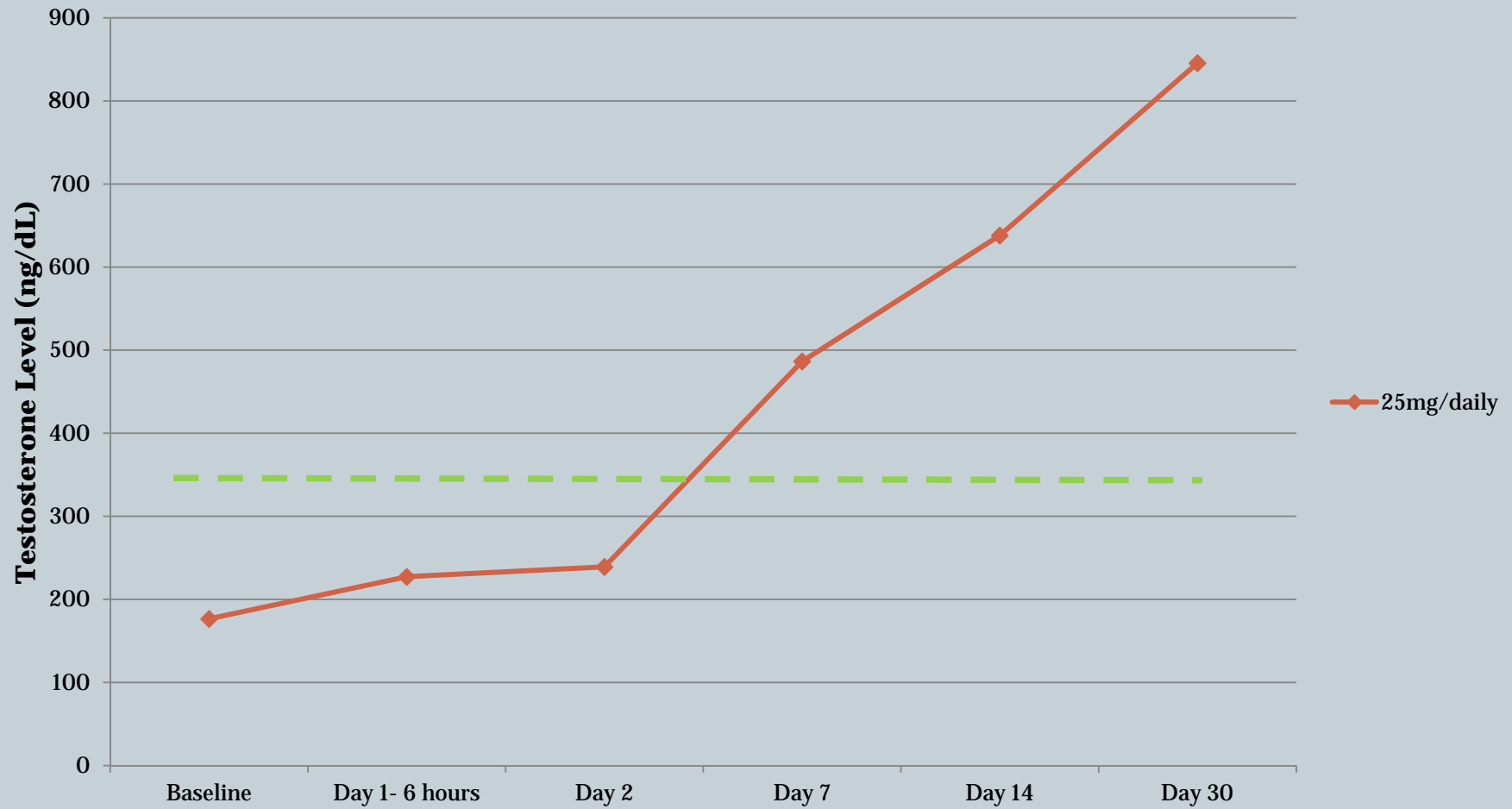


# Methods



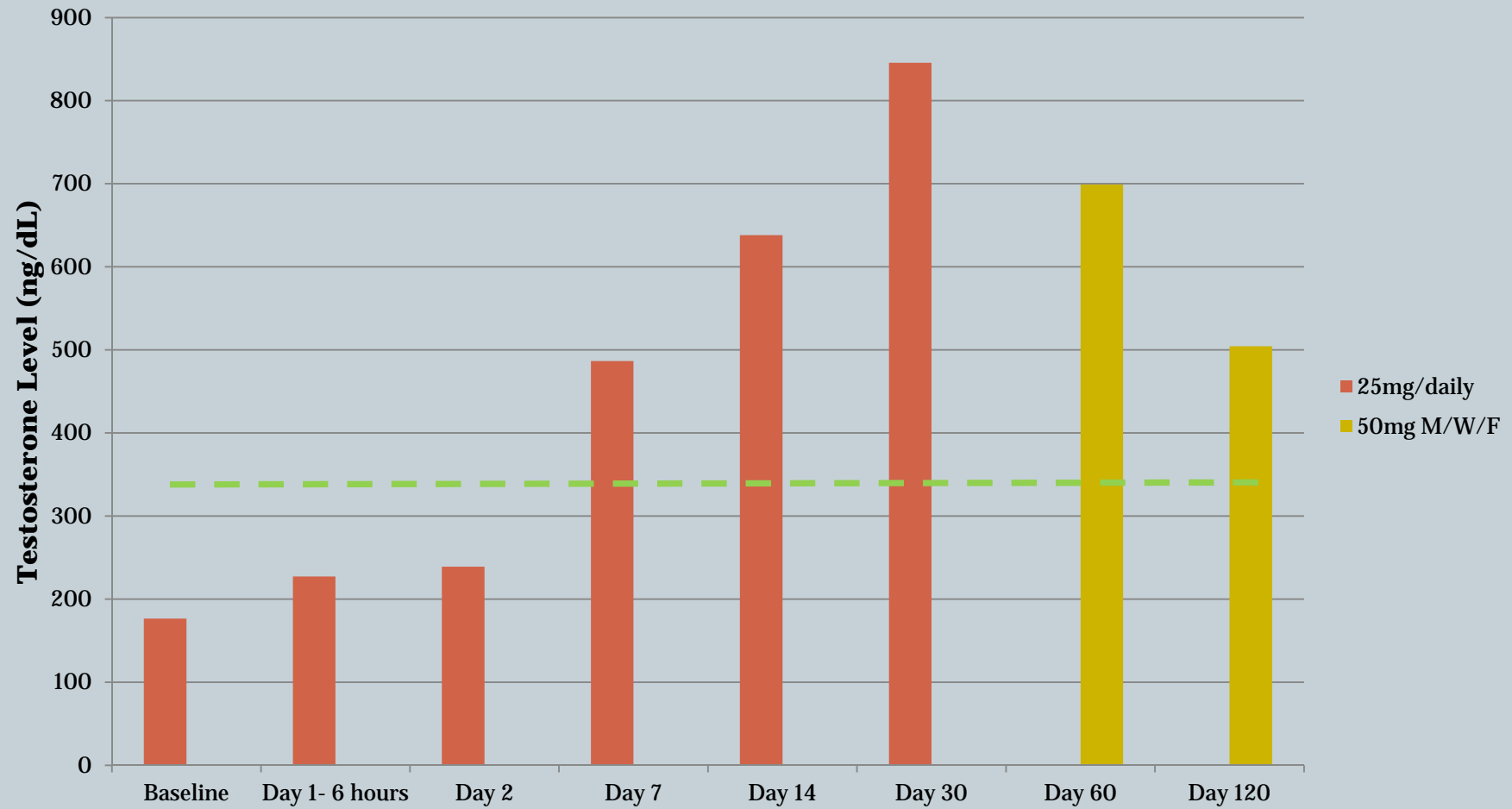
- Fourteen men confirmed to have had at least two prior blood levels documenting hypogonadism (T <300ng/dl)
- Enrolled in an IRB-approved prospective trial of a needle-free injection of testosterone cypionate for TRT.
- All subjects were instructed on the correct way to use the needle-free device to administer 25mg of the commercially available 100mg/ml testosterone cypionate in cottonseed oil daily, via subcutaneous delivery in the abdominal area.
- Blood level of testosterone was taken by the clinical staff at 6 hours post injection on Day 1, days 2, 7, 14 and 30.

# Results – Initial Study





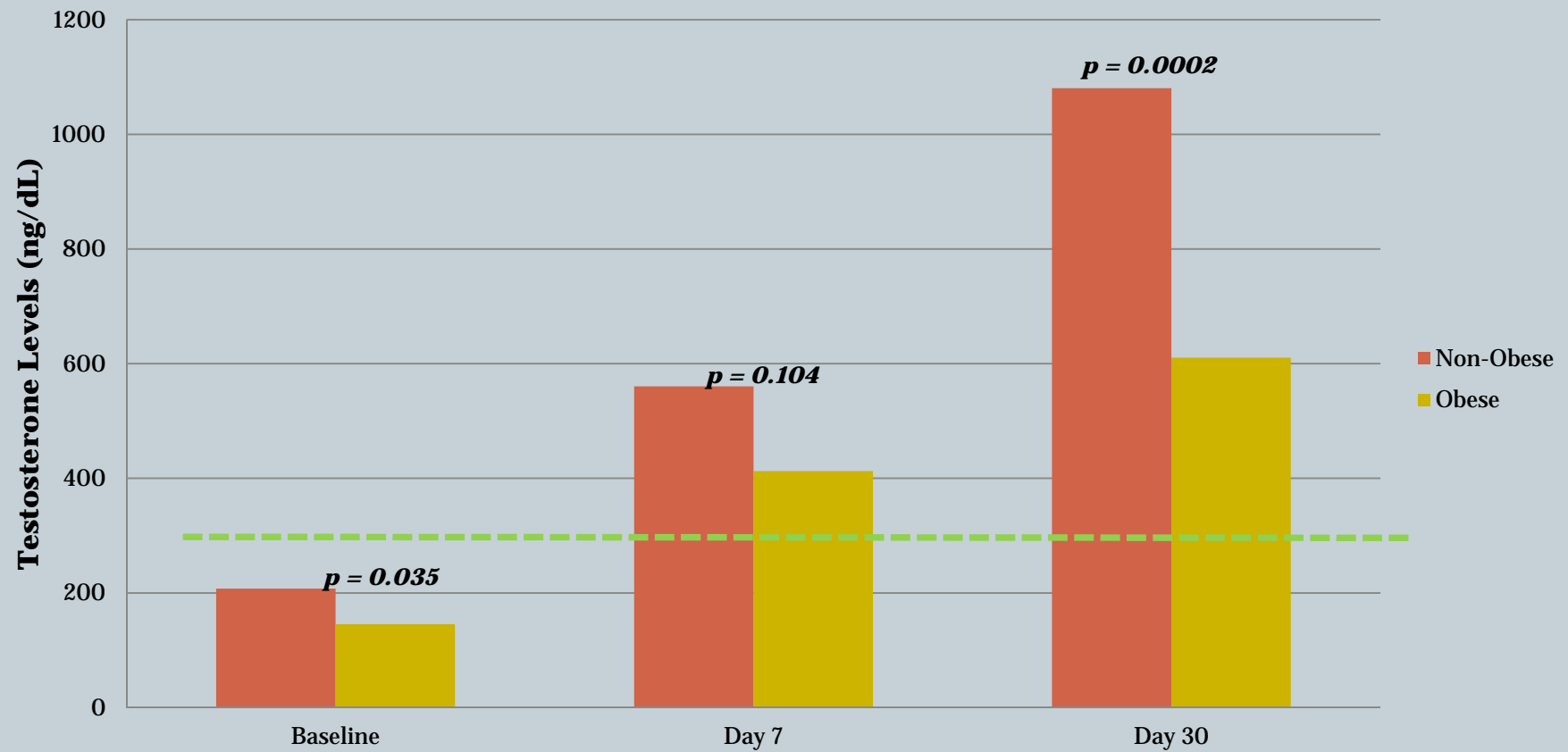
# Results- Extended Study



# Results – Effects of Obesity



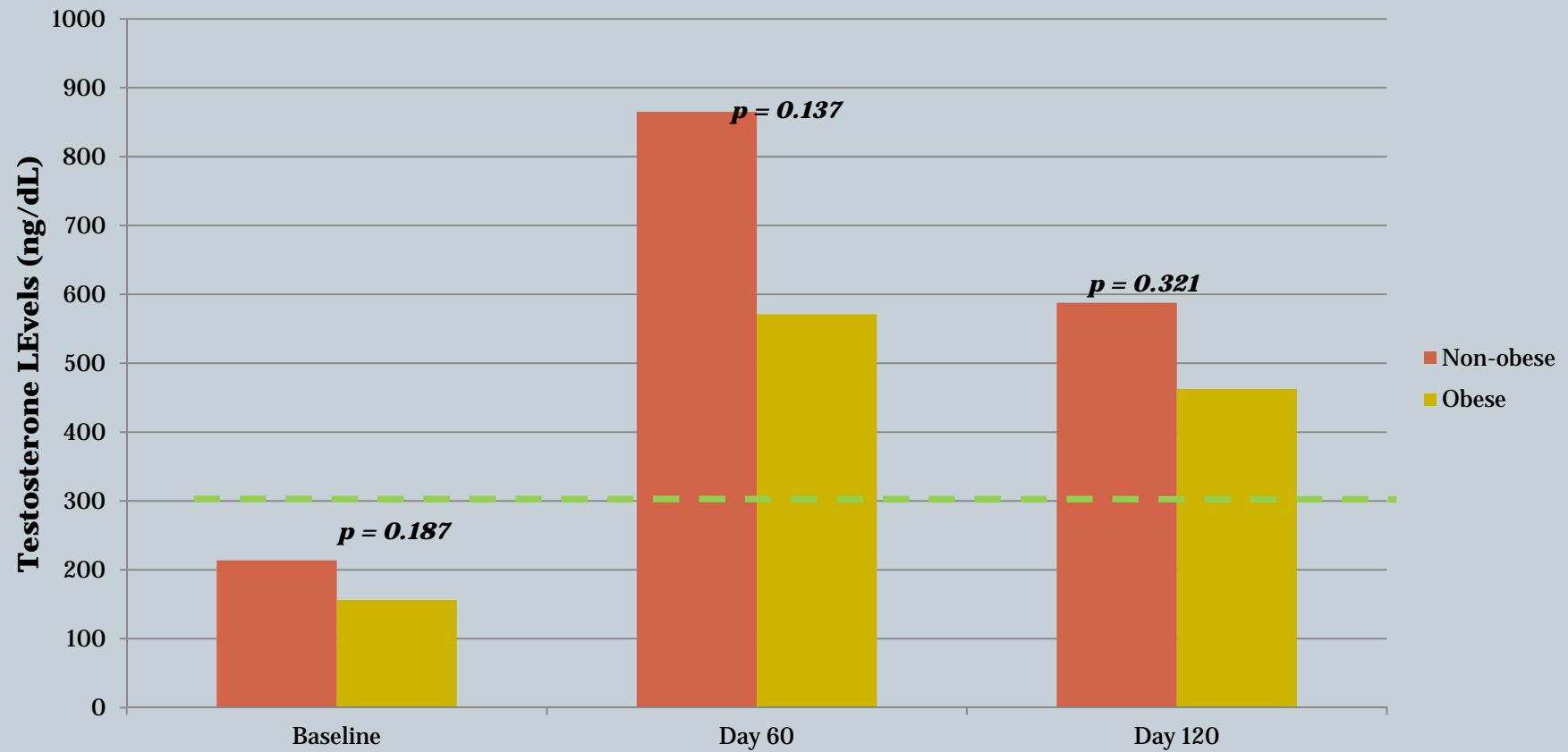
25mg/day Zetajet  
N = 14



# Obesity – Extended Study



50mg M/W/F Zetajet  
N = 9



# AMS Scores



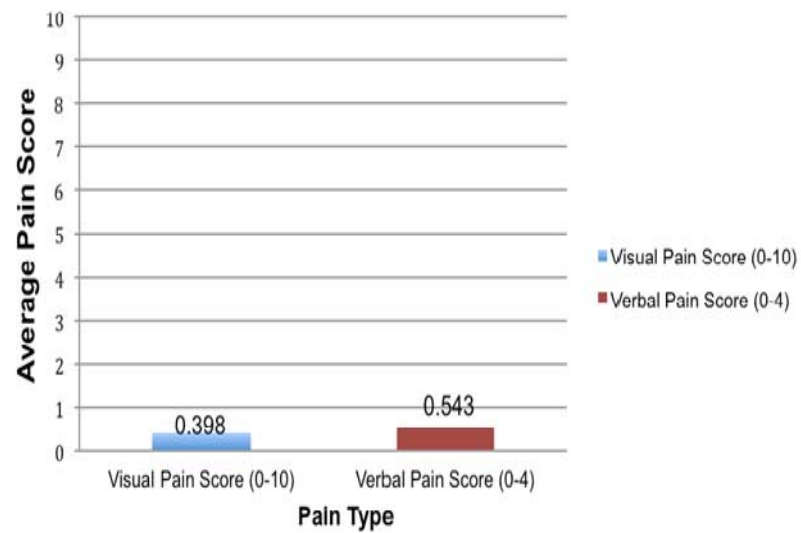
## Aging Male Scores



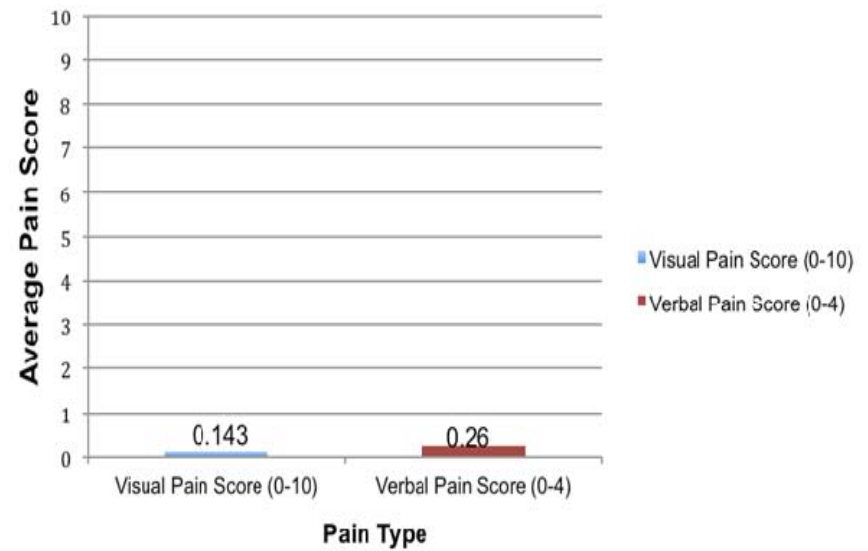
# Pain Score



**Average Pain 5 minutes after injection  
(N= 14)**



**Average Pain Scores 30 minutes after  
injection (N = 14)**



# Conclusions



- **Proof of concept needle-free delivery of testosterone cypionate is absorbed and maintains normal ranges of testosterone blood levels during TRT.**
- **Needle-free therapy was well tolerated with very low pain scores, and no adverse events.**
- **The technique/modality directly addresses many the shortcomings of other modalities and could provide self injection therapy with more stable levels, more consistent levels, and with low pain scores.**

# Future Directions



- Tolerability and T levels were optimized at the 50mg QODWO dosing.
- QODWO dosing prevents supra-physiologic levels as seen in daily injections in 4 of the 14 men at Day 30.
- A second IRB approved prospective trial of 10 men is underway, to evaluate testosterone level pharmacokinetics from early on in the study using QODWO dosing, and to analyze AMS scores at day 30 and 120.