



BSPED UK Consensus National Guidelines for Sex Hormone Priming for Growth Hormone (GH) Stimulation Testing

Christina Wei (1) Cristina Partenope (2-3), Peter Clayton (4), Mehul Dattani (5), Liz Crowne(6)

(1) Evelina London's Children's hospital, GSTT, London; (2) St George's University Hospital NHS Foundation Trust, London; (3) San Raffaele Hospital, Milan, Italy; (4) Royal Manchester Children's Hospital; (5) Great Ormond Street Hospital for Children, London; (6) Bristol Royal Hospital for Children

A recent national audit and Delphi consensus process among members of the BSPED (1) confirmed an agreement to priming with sex hormones prior to growth hormone provocation tests in children in the peri-pubertal age for suspected growth disorders.

The following guidelines are derived from consensus based on current agreed clinical practices and published literature.

PATIENT SELECTION

Children of the peri-pubertal age with minimal signs of puberty, defined as:

- Boys aged over 10 years and with testicular volumes of less than 6mls (Delphi 92%)
- Girls aged over 9 years with breast stage 2 or less (Delphi 87%)

DRUG CHOICE

- An oestrogen preparation should be the preferred drug of choice for both male (Delphi 72%) and females (Delphi 100%)
- Intramuscular testosterone may be used as an alternative in boys
- However, the choice of priming agent may be determined by local availability

EXAMPLES OF SEX STEROID PRIMING REGIMENS OPTIONS

Choices	Sex	Drug	Dose	Pros	Cons
Preferred	Males & females	17 β -oestradiol e.g. Estradiol Valerate	1 mg daily (< 20 kg) 2 mg daily (>20 kg) orally for 3 days before GH test (2–4)	Availability, well tolerated, side effects uncommon	
Preferred	Males & females	Conjugated oestrogen (e.g. Premarin®)	2.5 mg daily orally for 3 days before GH test	Availability, well tolerated, side effects uncommon	
Preferred	Males & Females	Ethinyl-oestradiol	10 micrograms daily for 3 days before GH test	Availability, well tolerated, side effects uncommon in girls	Intermittent availability Nausea and vomiting in boys
Alternative	Males	Testosterone depot (testosterone enanthate Or Sustanon®)	100 mg once only intramuscular administered 5 days before GH test	Availability Does not rely on patient compliance (administer by health care profession)	Local inflammation of injection site Testicular pain, priapism Hypersensitivity in patients allergic to nuts or soy in some testosterone preparations
Alternative	Males & females	Diethylstilbestrol (Stilbestrol®)	1mg twice a day orally for 2 days before GH test	Availability	Severe nausea and vomiting frequently observed Breast tenderness



REFERENCES

1. Wei C, Musson P, Clayton P, Dattani M, Randell T, Crowne E. Project to develop BSPED UK standardised guidelines for sex hormone priming and glucagon stimulation testing (GST) in children and adolescents. *Endocr Abstr.* 2019;66(OC5.1).
2. Grimberg A, DiVall SA, Polychronakos C, Allen DB, Cohen LE, Quintos JB, et al. Guidelines for Growth Hormone and Insulin-Like Growth Factor-I Treatment in Children and Adolescents: Growth Hormone Deficiency, Idiopathic Short Stature, and Primary Insulin-Like Growth Factor-I Deficiency. *Horm Res Paediatr.* 2017;86(6):361–97.
3. Martínez AS, Domené HM, Ropelato MG, Jasper HG, Pennisi PA, Escobar ME, et al. Estrogen priming effect on growth hormone (GH) provocative test: A useful tool for the diagnosis of GH deficiency. *J Clin Endocrinol Metab.* 2000 Nov;85(11):4168-72.
4. Molina S, Paoli M, Camacho N, Arata-Bellabarba G, Lanes R. Is testosterone and estrogen priming prior to clonidine useful in the evaluation of the growth hormone status of short peripubertal children? *J Pediatr Endocrinol Metab.* 2008 Mar;21(3):257-66
5. Wilson DM, Dotson RJN, Neely EK, Cohen P, Hintz RL, Rosenfeld RG. Effects of Estrogen on Growth Hormone Following Clonidine Stimulation. 1993 Jan;147(1):63-5
6. Chesover AD, Dattani MT. Evaluation of growth hormone stimulation testing in children. *Clin Endocrinol (Oxf).* 2016 May;84(5):708-14
7. Murray PG, Dattani MT, Clayton PE. Controversies in the diagnosis and management of growth hormone deficiency in childhood and adolescence. *Arch Dis Child.* 2016;101(1):96–100.

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