

Effects of Jogyeong-Seongjang-tang on Pubertal Suppression and Height Outcomes During Concurrent GH Therapy: A 5-Year Follow-Up Case Report

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Introduction

Growth hormone (GH) therapy is widely used for children with short stature; however, it may inadvertently accelerate pubertal onset, shorten the growth window, and reduce final adult height (FAH). Managing pubertal timing during GH treatment has therefore become a critical clinical challenge. Traditional Korean medicine (TKM) includes herbal prescriptions aimed at modulating pubertal progression and supporting continuous growth. This case report presents a 5-year follow-up of a girl treated with Jogyeong-Seongjang-tang concurrently with GH therapy, focusing on growth outcomes and suppression of GH-associated pubertal acceleration.

METHODS

Patient Profile

- Sex/Age:** F/6
- Chief Complaint:** Short stature
- Family history:** Father's height 175 cm, mother's height 155 cm
- Current History:** The patient exhibited slow height progression, significant picky eating, and low dietary intake. The parents noticed a new scalp odor, raising concerns for early pubertal activation. She also experienced recurrent herpes labialis during fatigue, with dust mite allergy as the only known atopic condition and no other notable medical issues.
- Predicted adult height (PAH):** 154 ± 1 cm
- Initial Physical Examination:**

	Height(cm)	Weight(kg)	BMI(kg/m²)
2020.09.26.	114.3	21.0	16.1

Treatment

- Herbal Formula:** Jogyeongseongjang-tang, administered twice daily.
- | Herb | Scientific name | Dose (g) |
|------|--|----------|
| 薏苡仁 | Coix lachrymal-jobi L. | 15 |
| 茵陳 | Artemisia capillaris Thunb. | 8 |
| 蓬朮 | Curcuma zedoaria Rosc. | 3 |
| 薑黃 | Curcuma longa L. | 3 |
| 陳皮 | Citrus reticulata | 3 |
| 枳實 | Citrus aurantium L. | 3 |
| 豬苓 | Polyporus umbellatus (Pers.) Fries | 3 |
| 藿香 | Agastache rugosa (Risch. Et Meyer) O. Kuntze | 3 |
| 蒼朮 | Atractylodes lancea (Thunb.) DC. | 3 |
| 連翹 | Forsythia suspensa (Thunb.) Vahl | 3 |
| 蘇葉 | Perilla frutescens var. acuta Kudo | 3 |
| 酸棗仁 | Zizyphus jujube Miller var. spinosa | 3 |
- Treatment Duration**
 - Jogyeong-Seongjang-tang: **5 years 1 month** (Sep 26, 2020 – Oct 18, 2025)
 - GH therapy : **3 years 4 months** (Jun 7, 2022 - Oct 18, 2025)

- Monitoring**
 - Anthropometrics: Height, Weight
 - Growth markers: **IGF-1, ALP**
 - Pubertal hormones: **LH, FSH, E2**
 - Safety labs: **AST, ALT**
- Efficacy Evaluation**
 - Growth: **Final recoded Height vs. PAH**
 - Pubertal status: **Sex hormone trends & menarche onset**

RESULTS

1. Overall Growth Outcomes

- Total height gain (5y 1m): **+36.1 cm**
- Pre-GH growth (2020–2022): **+15.5 cm**
- Post GH + Herbal therapy (2022–2025): **+20.6 cm**
- Final height (age 12): **150.4 cm**
→ Expected to exceed initial PAH (154 ± 1 cm)

Table 1. Growth trajectory (Height / Weight / BMI)

Date	Height (cm)	Weight (kg)	BMI (kg/m2)
2020-09-26	114.3	21.0	16.1
2021-09-14	120.3	23.5	16.2
2022-08-16	125.3	26.4	16.8
2023-06-10	129.8	30.7	18.2
2023-11-04	133.4	31.3	17.6
2024-07-14	139.9	33.1	16.9
2025-01-08	143.6	34.3	16.6
2025-07-05	147.7	37.7	17.3
2025-10-18	150.4	41.4	18.3

2. Hormonal Regulation

- Growth activity:** ALP remained elevated; IGF-1 increased appropriately → **ongoing growth plate activity maintained**
- Liver function:** AST/ALT remained within normal limits
- Sex hormones:** E2, FSH, LH remained **suppressed despite GH therapy**, indicating **pubertal delay**
- Pubertal Status:** Menarche not yet occurred at age 12

Table 2. Hormone trends (E2 / FSH / LH / IGF-1)

Date	E2 (pg/ml)	FSH (mIU/mL)	LH (mIU/mL)	IGF-1 (ng/ml)
2020-09-26	<15.0	1.81	<0.2	95.2
2021-09-14	<15.0	2.03	<0.2	133
2022-08-16	<15.0	2.17	<0.2	130
2023-11-04	<15.0	1.78	<0.2	297
2024-07-14	<15.0	1.86	0.25	215
2025-01-08	25.87	4.13	1.26	286
2025-07-05	43.63	4.98	2.28	292
2025-10-18	18.8	4.86	3.16	318

DISCUSSION & CONCLUSIONS

This case suggests that **Jogyeong-Seongjang-tang, when administered concurrently with GH therapy, may mitigate the pubertal acceleration typically induced by GH, thereby prolonging the effective growth window and enhancing overall height outcomes.** The findings indicate that herbal medicine may **stabilize growth-related physiology, support continuous height velocity, and counterbalance potential adverse effects of GH therapy**, highlighting the value of an **integrative therapeutic approach.** Further well-controlled studies are warranted to confirm these clinical implications and to elucidate the underlying mechanisms.