BIOMARIN®

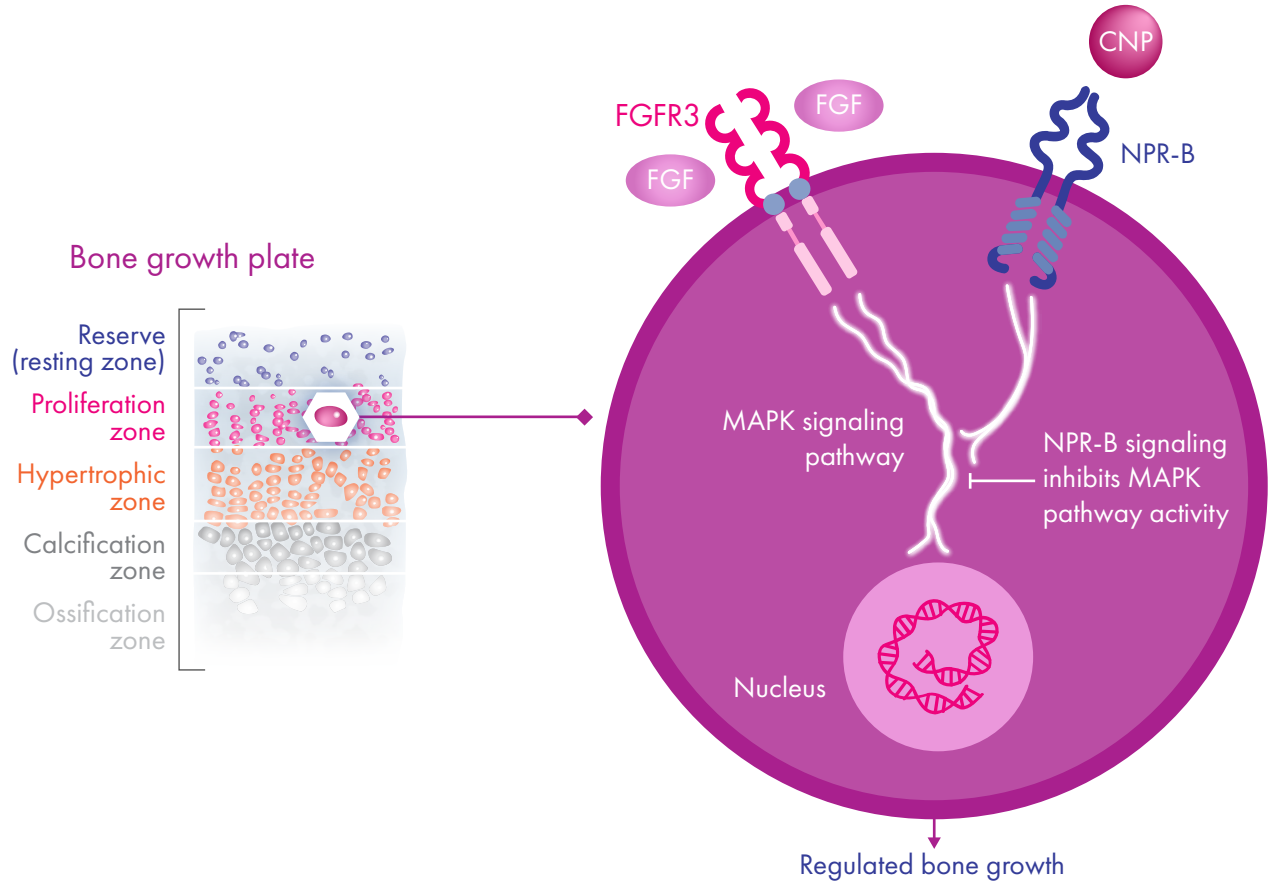
Achondroplasia in children: from diagnosis to management

Information for healthcare providers

DEVELOPED AND FUNDED BY BIOMARIN

MED-SC-0098 | September 2025

In children of average stature, endochondral bone growth is regulated by **a balance** between the **FGFR3 and NPR-B** signaling pathways

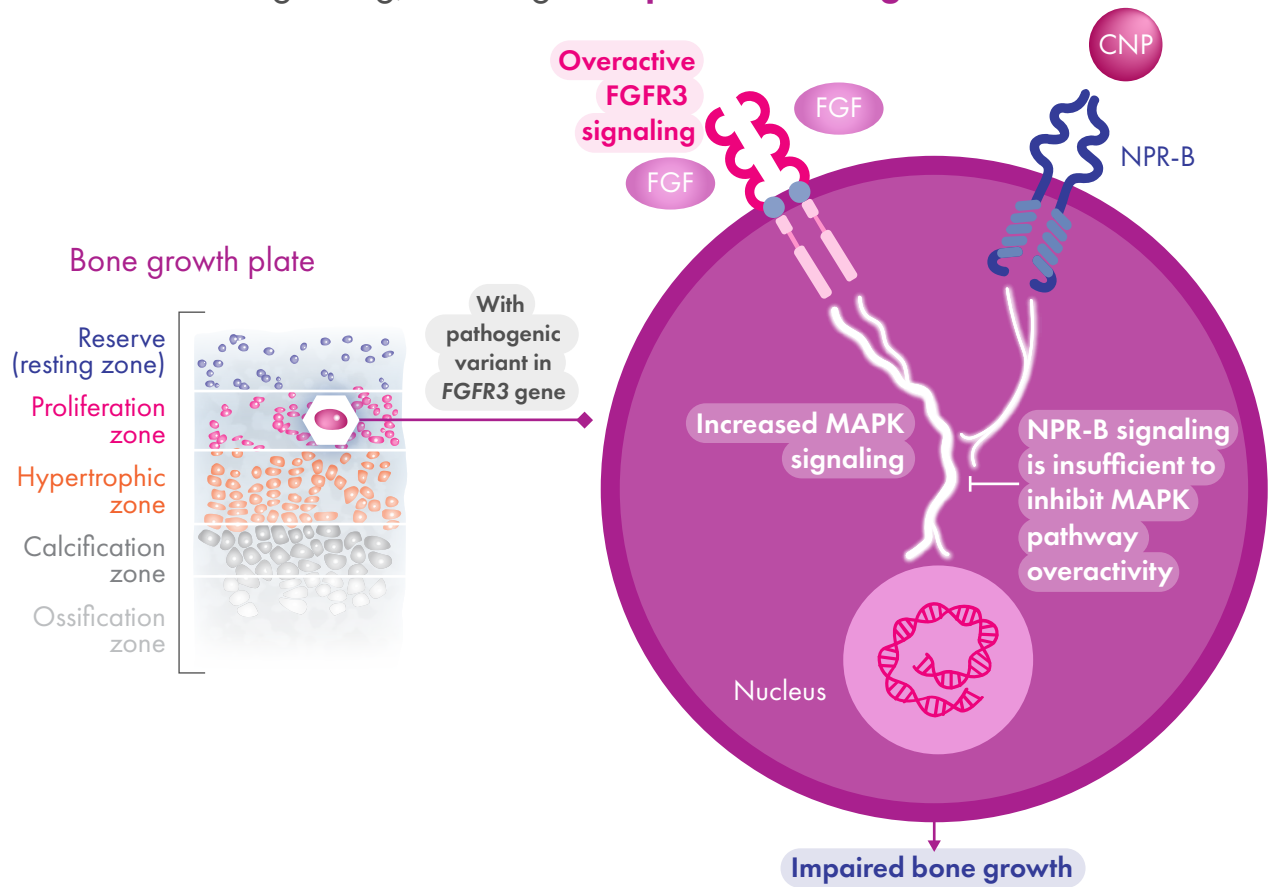


CNP, C-type natriuretic peptide; FGF, fibroblast growth factor; FGFR3, fibroblast growth factor receptor 3; MAPK, mitogen-activated protein kinase; NPR-B, natriuretic peptide receptor B

Lorget F *et al*. *Am J Hum Genet* 2012;91:1108–14

Achondroplasia is caused by a **gain-of-function mutation** in the ***FGFR3* gene**, leading to an **imbalance** in the FGFR3 and NPR-B signaling pathways

Endogenous levels of CNP, a master regulator of growth, are insufficient to overcome **overactive FGFR3** signaling, resulting in **impaired bone growth**

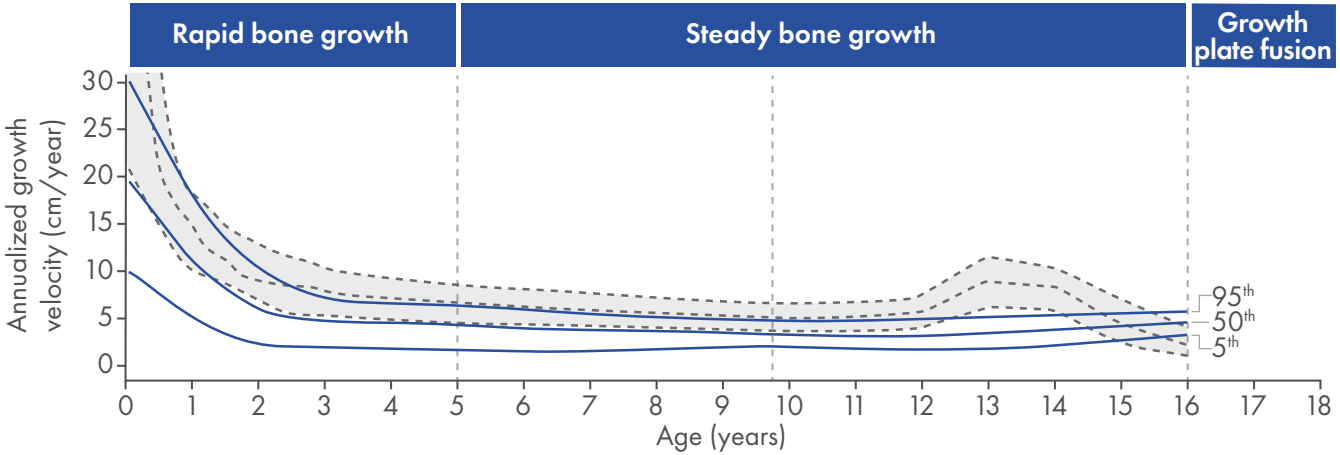


CNP, C-type natriuretic peptide; FGF, fibroblast growth factor; FGFR3, fibroblast growth factor receptor 3; MAPK, mitogen-activated protein kinase; NPR-B, natriuretic peptide receptor B

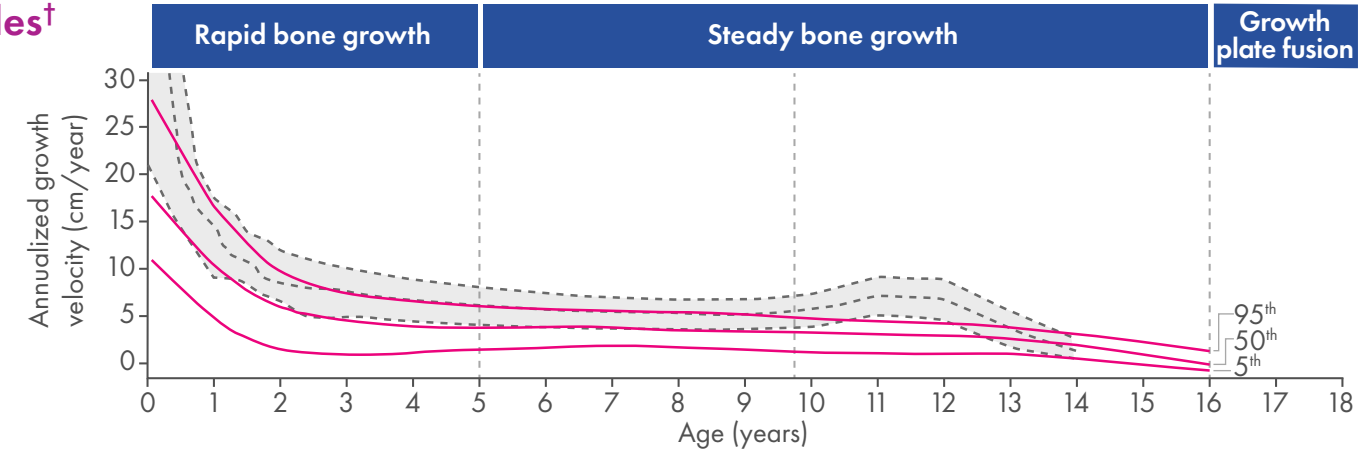
Lorget F *et al*. *Am J Hum Genet* 2012;91:1108–14

Differences in **annualized growth velocity*** between children with achondroplasia and children of average stature are particularly apparent during **infancy** and **puberty**[1]

Males†



Females†

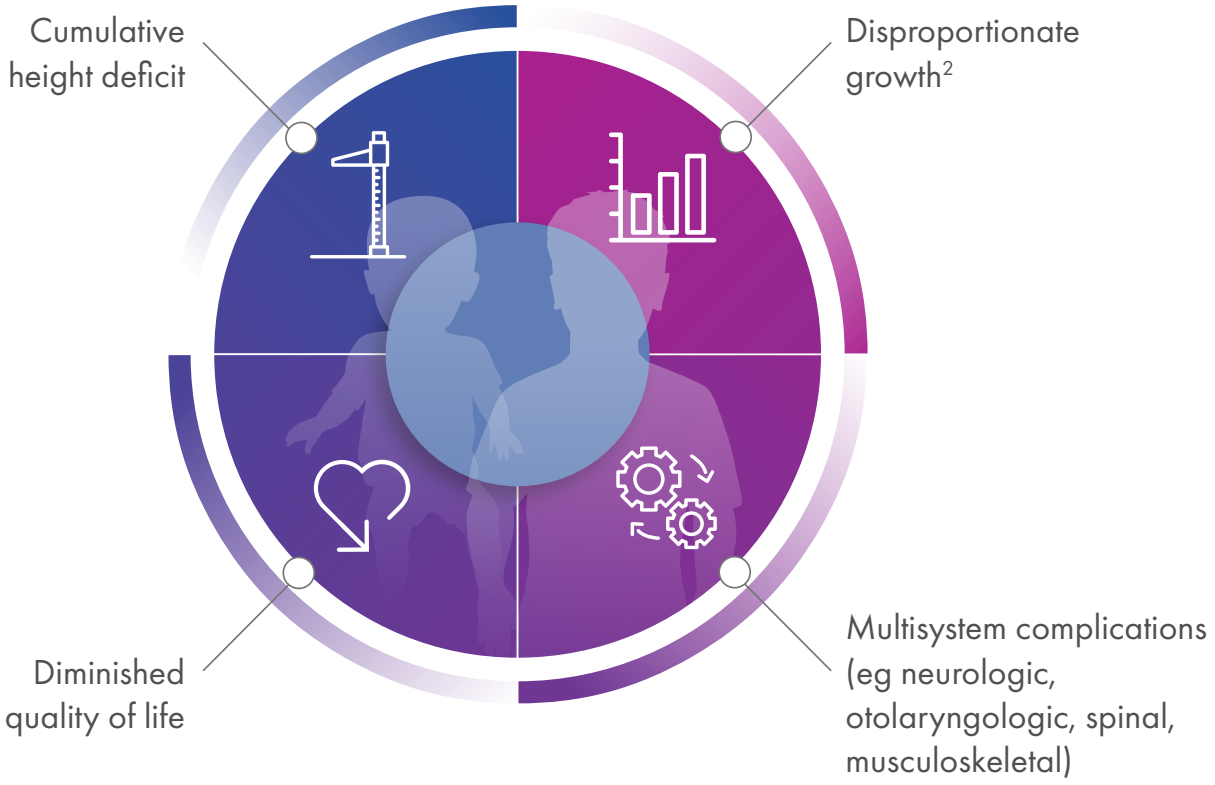


*Annualized growth velocity is the difference in standing height over the course of a year, calculated as:
[(height at post-baseline visit – baseline height) / (date at post-baseline visit – date at baseline visit)] x 365[2]

†Annualized growth velocity curves (5th, 50th, and 95th percentiles) in children with achondroplasia aged 0–16 years (solid lines) compared with data for children of average stature (dashed lines and shaded section)

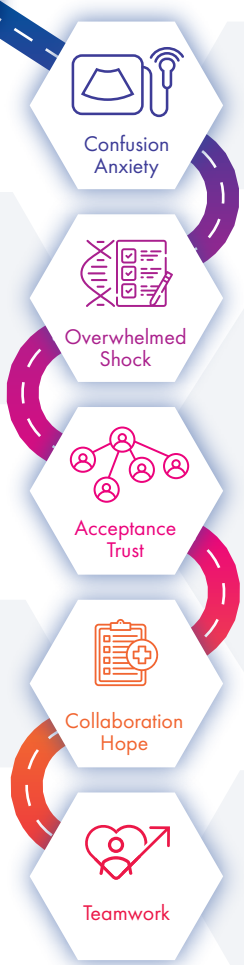
1. Hoover-Fong J *et al. Am J Clin Nutr* 2008;88:364–71; 2. Savarirayan R *et al. Lancet* 2020;396:684–92

Achondroplasia is a **rare skeletal dysplasia** that can impose a **substantial burden** on affected children and their families[1]



1. Hoover-Fong J *et al. Bone* 2021;146:115872; 2. Hoover-Fong J *et al. Orphanet J Rare Dis* 2021;16:522

It is important to recognize that children and their caregivers will experience a range of emotions at each stage of the achondroplasia journey



Presentation[1]

Prenatal ultrasounds that identify **short fetal limbs** may raise suspicion of skeletal dysplasia; newborns presenting with **short limbs**, **large heads**, and **short fingers** should be investigated to identify the cause

Diagnosis[2]

Diagnosis is typically made ***in utero*** or during **early infancy** and requires **clinical** and **radiographic** assessment

In cases of diagnostic uncertainty, identification of an ***FGFR3*** **pathogenic variant** is sought via **genetic testing**

Post-diagnosis referral[3–5]

According to the International Consensus Statement on achondroplasia (2022), referral to a **skeletal dysplasia reference center** or a **healthcare professional with expertise in achondroplasia** should be made as soon as possible following diagnosis

Timely referral is vital to plan **appropriate management**

Specialists treating children with achondroplasia may include **pediatric endocrinologists**, **medical geneticists**, and **pediatric orthopedic surgeons**

Management considerations[2]

Clinicians can evaluate a range of **management approaches** to address **achondroplasia-associated complications**

Ongoing care[6,7]

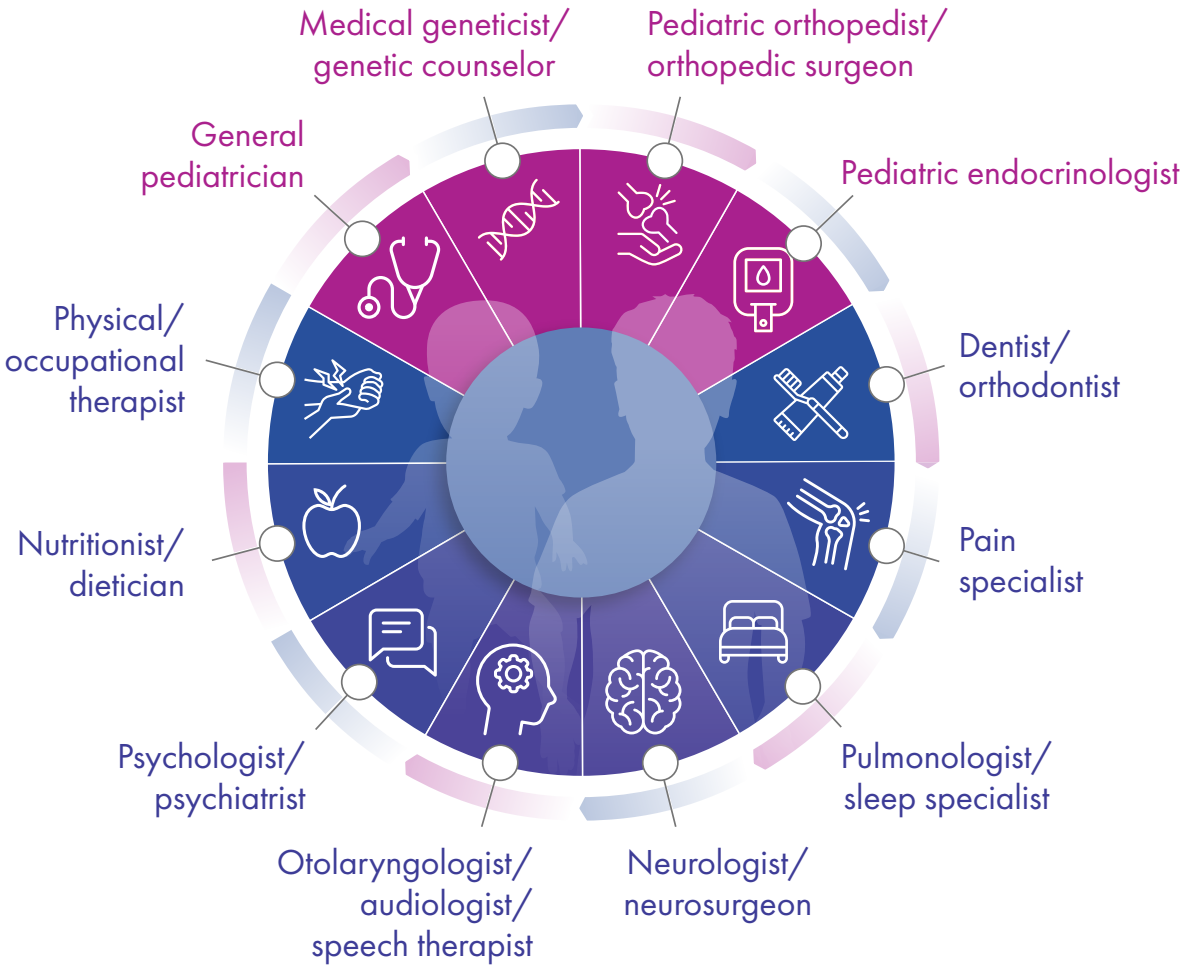
Multisystem complications present at different stages of life, necessitating **lifelong multidisciplinary care**

Specialists caring for adults with achondroplasia include **physicians**, **surgeons**, **physical therapists**, and **psychologists**

FGFR3, fibroblast growth factor receptor 3 gene

1. Legare JM. Achondroplasia. In GeneReviews® [Internet]. 1998. Available at: https://www.ncbi.nlm.nih.gov/books/NBK1152/. Accessed September 2024; 2. Pauli RM. *Orphanet J Rare Dis* 2019;14:1; 3. Savarirayan R *et al. Nat Rev Endocrinol* 2022;18:173–89; 4. Cormier-Daire V *et al. Orphanet J Rare Dis* 2022;17:293; 5. Hoover-Fong J *et al. Pediatrics* 2020;145:e20201010; 6. Hoover-Fong J *et al. Bone* 2021;146:115872; 7. Fredwall S *et al. Orphanet J Rare Dis* 2022;17:318

Due to the multisystemic effects of achondroplasia, it is critical to adopt a **multidisciplinary approach** when caring for children with the condition[1–5]



1. Savarirayan R *et al. Nat Rev Endocrinol* 2022;18:173–89; 2. Hoover-Fong J *et al. Pediatrics* 2020;145:e20201010; 3. Tofts LT *et al. Paediatr Child Health* 2023;59:229–41; 4. Cormier-Daire V *et al. Orphanet J Rare Dis* 2021;16:333; 5. Llerena J *et al. BMC Pediatr* 2022;22:492

Key considerations

The language of achondroplasia

When delivering a diagnosis of achondroplasia, it is essential to communicate in a **compassionate** and **informative** manner. **Key considerations** for doing so include:

Providing a setting that ensures privacy, while supplying comprehensive and balanced information to aid future planning

Recognizing that the amount of information caregivers wish to receive about their child's diagnosis may vary

Using clear, easy-to-understand language and avoiding medical jargon

Allowing caregivers to express emotions and acknowledging them as they arise

Ensuring adequate time for questions and being prepared to provide accurate answers to support informed decision-making

Berkey FJ *et al. Am Fam Physician* 2018;98:99–104

Key considerations

The language of achondroplasia

When talking about achondroplasia, children and their caregivers need to feel **comfortable** and **respected**

Instead of saying...	Say...
Achon	**Achondroplasia**
The "M" word or dwarf	**Child with achondroplasia or their name**
Disease or disorder	**Condition**
Mutation	**Change in the gene or variant**
Height impairment	**Short stature**
Normal stature	**Average stature**
Differing bone growth, abnormal bone growth, or stunted bone growth	**Impaired bone growth**

Effective management of the **medical**, **functional**, and **psychosocial issues** that can occur in children with achondroplasia is key to facilitating **optimal outcomes** and **improved quality of life** for them and their families[1]

Supportive care, such as:[1]

- Adaptive equipment and/or environmental modifications
- Regular audiology assessments
- Speech and language therapy
- Physiotherapy

Therapeutic and procedural interventions, such as

- Treatments and available clinical trials[2]
- Neurosurgery, orthopedic surgery, and otolaryngologic surgery[1]

Children with achondroplasia benefit from **early referrals and intervention**[1]

CNP, C-type natriuretic peptide; FDA, Food and Drug Administration

1. Savarirayan R *et al. Nat Revs Endocrinol* 2022;18:173–9; 2. Murton MC *et al. Adv Ther* 2023;40:3639–80