FUNDACIÓ
HOSPITAL DE NENS DE BARCELONA

ESPE 2019
19–21 September
Vienna, Austria
Variety and Variation in Paediatric Endocrinology

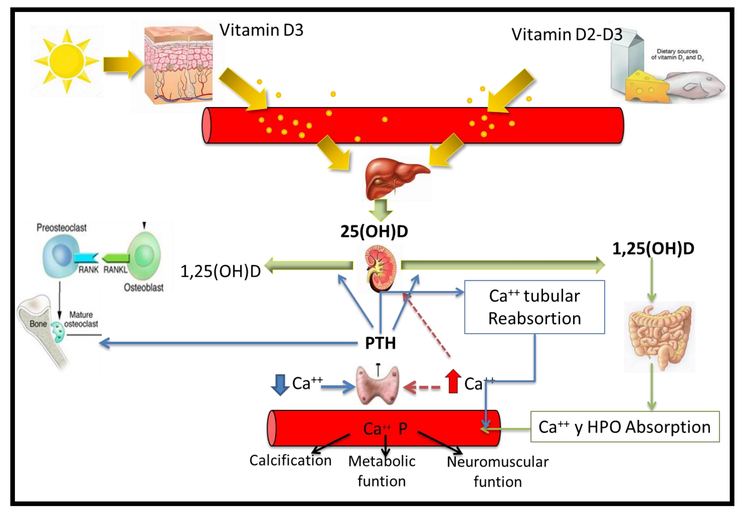
Relation of serum 25 hydroxy-vitamin D3 levels with body-mass index in pediatric patients

Paula Sol Ventura, Xavier Herrero, Zelmira Bosch, Anabella Grigolato; Romina Del Valle Rossi, Marisa Torres. Hospital de Nens de Barcelona. Division of Endocrinology

Introduction

- Vitamin D is an essential prohormone for correct absorption of calcium in intestine and its deficiency is associated in children with rickets, a disease characterized by a lack of mineralization of bone and growing cartilage.
- The "classic" function of vitamin D is regulation of phosphocalcic metabolism.
- There is consensus that the dosage of the plasma level of the 25OH vitamin D (25(OH)D), is the one that best reflects the state of this vitamin in an individual, because this is the most stable metabolite with a longer half-life (2-3 weeks).
- There is currently no consensus regarding cut-off points to define "sufficiency", "insufficiency" and "deficiency".
- Childhood obesity has been associated with low circulating serum concentrations 25(OH)D, and vitamin D deficiency has been shown in the range of 17–57%, depending on how vitamin D deficiency is categorized.

Vitamin D metabolism and its effects on phosphocalcic metabolism regulation



Objectives

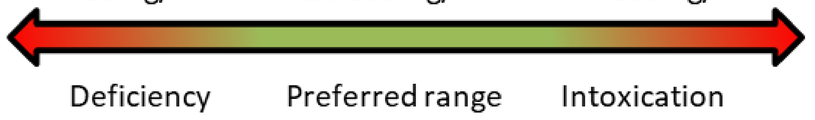
- The aims of this study were to determine whether vitamin D deficiency is more prevalent among children and adolescents with body-mass index (BMI) increase compared to their normal weight peers and analyze serum levels of 25(OH)D according to age and month of extraction in pediatric patients in Barcelona, Spain.

Materials and methods

- **Retrospective study**, clinical history review, CEIC approved
- Patients attended between June 2016 to June 2018, Barcelona, Spain (latitude 41°23.327' N).
- **Inclusion criteria:** age under 18 years, healthy with normal weight children visited by Ambulatory Pediatrics or overweight or obesity children visited by the Children's Endocrinology Service.
- **Exclusion criteria:** age above 18 years, intake of medications known to affect vitamin D metabolism as well as intake of supplementary vitamin D or calcium and diseases affecting calcium or vitamin D metabolism
- **Variables:** 25(OH)D (Chemiluminescent Immunoanalysis), age, BMI, month of extraction.

Definition of Vitamin D Deficiency

		Endocrine Society [3] (ng/mL)		
Deficiency	>15	< 20	<10	<12
Insuffiency	16-20	21-30	11–20	12-20
Preferred range	> 20	> 30	> 20	>20
Intoxication	> 150	> 150	--	>100



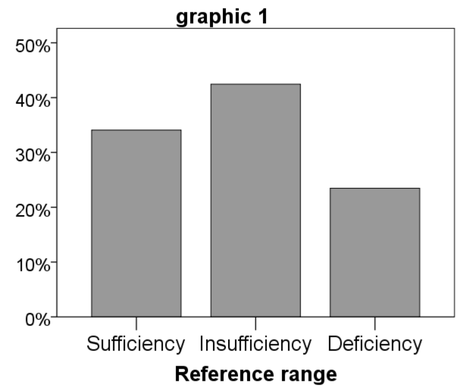
Bibliography:

1. Misra M, Pacaud D, Petryk A, Collett-Solberg PF, Kappy M, Drug and Therapeutics Committee of the Lawson Wilkins Pediatric Endocrine Society. Vitamin D Deficiency in Children and Its Management: Review of Current Knowledge and Recommendations. Pediatrics [Internet]. 2008 Aug 1 [cited 2019 May 31];122(2):398–417
2. Ross AC, Manson JE, Abrams SA, Aloia JF, Brannon PM, Clinton SK, et al. The 2011 Report on Dietary Reference Intakes for Calcium and Vitamin D from the Institute of Medicine: What Clinicians Need to Know. J Clin Endocrinol Metab [Internet]. 2011 [cited 2019 May 31];96(1):53–8.
3. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al. Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab [Internet]. 1911
4. Braegger C, Campoy C, Colomb V, Decsi T, Domellof M, Fewtrell M, et al. Vitamin D in the Healthy European Paediatric Population CONSENSUS STATEMENT. JPGN [Internet]. 2013 [cited 2019 May 31];56(6).
5. Munns CF, Shaw N, Kiely M, Specker BL, Thacher TD, Ozono K, et al. Global Consensus Recommendations on Prevention and Management of Nutritional Rickets. 2016;

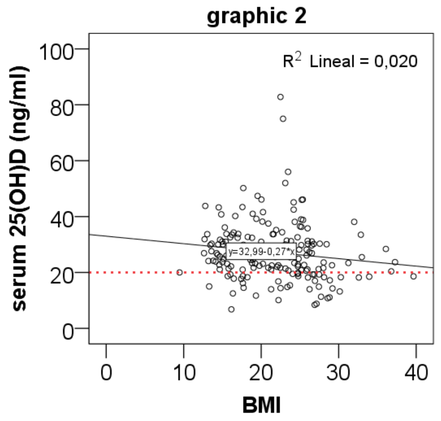
Results

The medical records of 179 patients (female:96/male:83) were reviewed, mean age: 10.1 years (95%CI:9.4-10.7), 39.1% normal weight children and 60.9% overweight or obesity children. Of the total of 25(OH)D determinations obtained, we observed levels of sufficiency (≥30 ng/ml) in 34.1% patients, insufficiency in 42.5% (20-29 ng/ml) and deficiency in 23.5% (<20 ng/ml) (graphic 1)[3]. We detected significant negative relationship between 25(OH)D and BMI (rho: -0.211, p: 0.005) (graphic 2), and between 25(OH)D and age (r: -0.281; p: 0.000) (graphic 3); and significant positive relationship between 25(OH)D and month of extraction (r: 0.256, p=0.001) (graphic 4), increasing levels during summer months (August, average: 49.8ng/ml, 95%CI:15-110) and decreasing during winter (January, average: 21.3ng/ml, IC95%: 16-26.7). There is also a progressive fall in values of 25(OH)D since 10.5 years of age (mean: 24.1 ng/ml, 95% CI: 18.3-29.8).

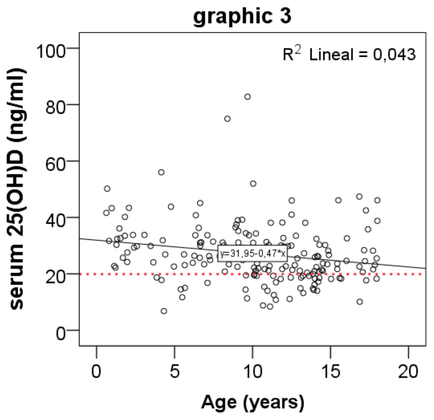
graphic 1



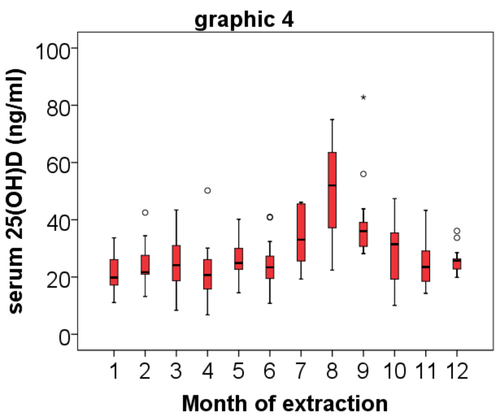
graphic 2



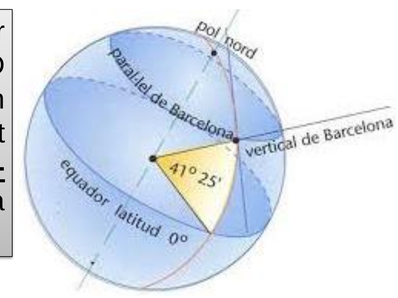
graphic 3



graphic 4



The radiation required for the production of vitamin D in winter in the northern hemisphere does not reach latitudes above **35-40º**, the Iberian Peninsula is between 36 and 43.6º



Conclusion

- These results suggest that there is an **inverse association between BMI and 25(OH)D levels**.
- **Vitamin D decreases** significantly during **winter and** from the **beginning of puberty**, moment of great vulnerability due to the fact that the maximum peak of corporal growth takes place.