



UNIVERSITÀ
DEGLI STUDI
DI MILANO



Museo Universitario
delle Scienze
Antropologiche,
mediche e forensi
per i diritti umani



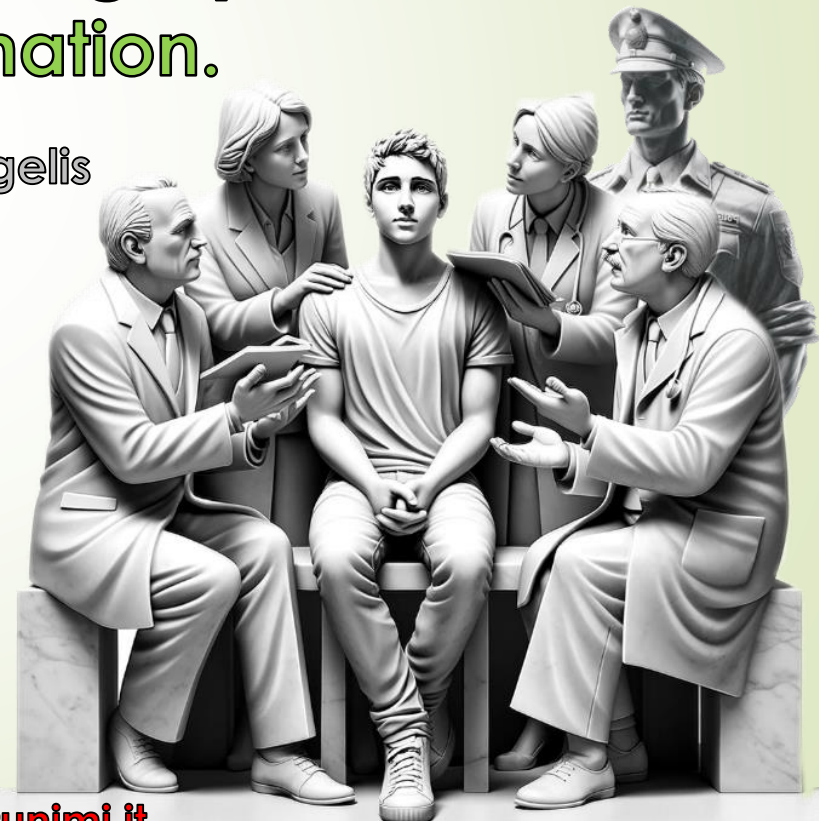
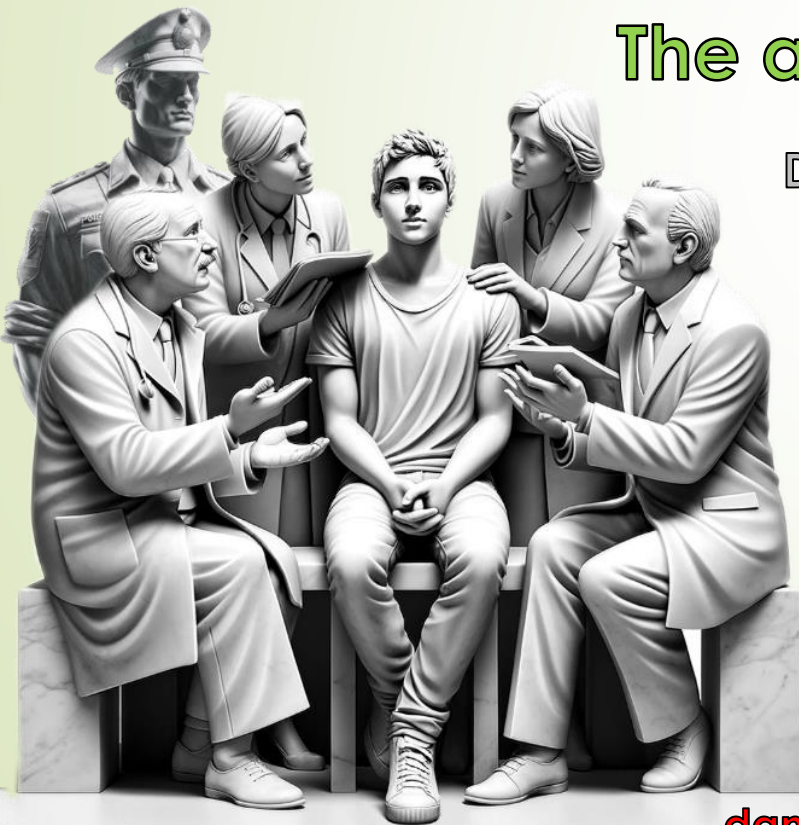
LABORATORIO DI ANTROPOLOGIA E ODONTOLOGIA FORENSE

4, 5 and 6 September 2024

6th international EFJCA Conference

Children as victims: Unaccompanied minors and medicolegal assessment of fragility. The age estimation.

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SOME PRELIMINARY CONSIDERATIONS + WHAT WE WILL TALK ABOUT TOGETHER.

The very fact of being a minor corresponds to a state of **vulnerability**.

It is a period of life that **needs special care and attention**, especially when the minor is an unaccompanied migrant.

This is not just an **ethical duty**, but an **obligation** dictated by national and international laws.



The recognition of minor status, when it is in doubt, is a necessary and fundamental step for the protection of these vulnerable individuals and to ensure that they can **benefit from all the rights granted to them** by the Italian state and international conventions.

During this presentation, we will discuss the **methodologies** we use, the **challenges** we face, and the **implications** of our findings for both the minors involved and the legal system.

- We study both cadavers and living individuals for **forensic and historical purposes**.
- Expertise essential in **legal investigations**, helping to **solve crimes** and **deliver justice to victims**.
- Providing also insights into past cultures and societies.

•strong **humanitarian mission**.



•Identification of victims of violence, migration and disasters, ensuring they and their **relatives are treated with respect and dignity**.

•Our goal is to make the rights of these individuals and the **rights** of their families real and **accessible**.

•Forensic and humanitarian work also includes **age estimation**, particularly for unaccompanied young migrants.

•This process ensures that minors receive all the **rights and protections they are entitled to**, ensuring their safety and fair treatment.



Importance of Age Recognition for the Protection of Unaccompanied Minors

- Crucial for their **asylum and protection**, a principle strongly supported by the Italian state.
- If a minor is a victim of a crime, confirming their age ensures they receive a **fair and sensitive trial** adapted to their specific needs and situation.
- Essential for properly assessing the severity of the crime and **determining the appropriate punishment for the perpetrator**.
- Determining someone as a minor guarantees **they receive all the rights** that Italian minors are entitled to.



- Given their vulnerability, minors must have the right to a **fair legal trial if accused of a crime**.
- Age estimation ensure that, under Italian law, minors receive all the protections and legal considerations **they are entitled to**

Why is age verification required for children?

Crimes in which the victim's age is a determining factor.


- Estimating a minor's age is crucial when they are a **victim of a crime**.
- This ensures that the legal process takes into account their young age and **specific needs**.
- Knowing the minor's exact age guarantees they receive the **special protections and care** necessary for someone their age.
- Correctly identifying a minor's age helps the legal **system better understand the impact of the crime** on the victim.



- It also ensures that the **punishment for the perpetrator** is appropriate.

Why is age verification required for children?

Correction of age (e.g., in adoption procedures for placement in the most appropriate school grade)

- Social and administrative purposes.
 - Ensuring the correct **school placement**, which is crucial for their education and development.
 - Learn with peers of the same age, benefiting their **social interactions and emotional well-being**.
 - Proper **educational opportunities**, support, and resources they need.
- 
- Positively impacts their overall well-being, aiding their growth and **integration into society**.

Why is age verification required for children?

To determine the criminal responsibility of the person (ages 14-18)

- If the minor is over 14, they can be held **accountable** in a criminal process.
- If the minor is under 18, their case must be handled by a **juvenile court**.
- This ensures that the legal process respects the minor's rights and **treats them fairly according to their age**.



Why is age verification required for children?

Assess the possibility that the unaccompanied migrant is a minor (under 18)

- Recognizing unaccompanied young migrants as minors is crucial to ensure they receive all the **rights minors are entitled to**.
- This includes the right to **asylum, proper care, shelter, education, healthcare legal protection** which are essential for their safety and well-being.
- Confirming their status as minors allows these vulnerable migrants to **access the same rights and protections** granted to Italian children.



In 2023, there were 20,089 minors, with young males making up 85.1% of the total. Of these minors, 97.2% were aged between 15 and 17, and 44.6% were 17 years old.

For some of these minors, when there are no valid documents and there is doubt about whether they are adults, it becomes necessary to **verify if they have reached the age of majority**. This is an important step to ensure they are treated correctly under the law and that they **receive the appropriate rights and protections as minors**.



MOST FREQUENT REQUESTS/SERVICES:

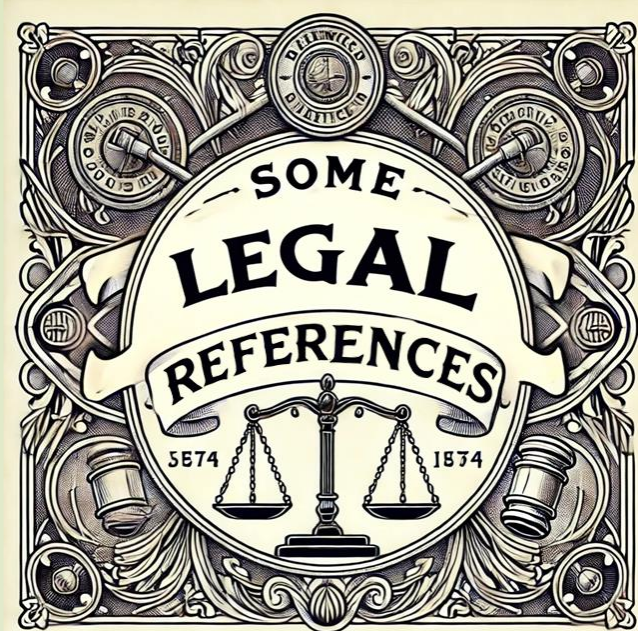
**CRIMINAL RESPONSIBILITY: Public Prosecutors – Judges
Judicial Police**

+

Since 2017, a protocol signed with the Municipality of Milan, the Public Prosecutor's Office, the Juvenile Court, the Police Headquarters, and the Prefecture.

CRIMINAL RESPONSIBILITY / UNACCOMPANIED FOREIGN MINORS (MSNA)





Art. 349 of the Code of Criminal Procedure:

The judicial police shall proceed with the **identification of the person** against whom the investigations are being conducted...

...including, if necessary, taking fingerprints, photographs, **anthropometric measurements, and other checks**...

...The procedures mentioned in the previous sentence are always carried out...for a citizen of a State not belonging to the European Union.

Code of Criminal Procedure for Juvenile Defendants:

Art. 8. Determination of the Age of the Minor

1. When there is **uncertainty about the minor age** of the defendant, the judge orders an **expert examination**, even on their own initiative.
2. If, even after the expert examination, **doubts about the minor age persist, it is presumed** in all respects.
3. The provisions of paragraphs 1 and 2 also apply when there is reason to believe that the defendant is **under fourteen** years of age.

**LEGISLATIVE DECREE March 4, 2014, No. 24
Prevention and Suppression of Human Trafficking**

Art. 4

...In cases where there are reasonable doubts about the age of the victim and the age cannot be verified through identification documents, and in respect of the best interests of the minor, **the age of unaccompanied minors** who are victims of **trafficking shall be determined through a multidisciplinary age assessment procedure**, conducted by specialized personnel... For the same purpose, **the minor age of the foreigner is also presumed in cases where the multidisciplinary procedure does not allow for the accurate determination** of the individual's age.

**LAW April 7, 2017, No. 47 (Zampa Law)
Provisions on the Protection Measures for Unaccompanied Foreign Minors**

Art. 4

... The **Public Prosecutor's Office at the Juvenile Court** may order **socio-health examinations aimed at determining the age**.

Art. 6. The socio-health age assessment must be conducted in an **appropriate environment** with a **multidisciplinary approach by adequately trained professionals**... using **the least invasive methods** possible...

Art. 8. If doubts about the minor's age persist even after the socio-health assessment, the minor's age is presumed for all legal purposes.

**UNIFIED STATE-REGION CONFERENCE
July 2020
(Unaccompanied Foreign Minors - MSNA)**

LEGISLATIVE DECREE October 5, 2023, No. 133

...in the case of **significant, multiple, and closely occurring arrivals**... it may immediately order the performance of **anthropometric measurements or other medical examinations, including radiographic tests, aimed at determining the age.**

UNIFIED STATE-REGION CONFERENCE July 2020 (Unaccompanied Foreign Minors - MSNA)

The agreement stipulates that:

- The age assessment must be conducted by a **multidisciplinary team of professionals** from the Regional Health Service, consisting of a **social worker, a pediatrician with specific expertise in auxology, a developmental psychologist and/or a child neuropsychiatrist, and a cultural mediator.**
- The operational procedure for age assessment begins with a social interview aimed at gathering a life history of the individual, followed by a neuropsychiatric and/or psychological evaluation, and finally a pediatric/auxological examination.
- These latter examinations include medical measurements that must be applied following a gradual implementation, prioritizing the least invasive methods for the minor.

“If, after the pediatric-auxological evaluation, integrated with the neuropsychological and social assessment, there are still doubts about the age, diagnostic imaging tests may be performed, using radiological examinations as a last resort.”



The multidisciplinary activity of biological age assessment conducted by **LabAnOF** is structured by

- applying international guidelines to the current regulatory framework, with an
- awareness of and respect for the fundamental rights of the individual, and in
- adherence to the principle of presuming minority age in cases of doubt.

There is broad agreement within the scientific community on the most suitable methods currently available:

- **Medical examination**
- **Radiographic assessments**

Multidisciplinary group:

Medical Doctors, Forensic Doctors, Pediatricians, Dentists, Anthropologists, Radiologists...

With the presence of a cultural mediator.





The regulations require a suitable environment, one that is not harmful to mental or physical health, and the use of the least invasive methods possible.

These conditions are, of course, ensured not only by the presence of highly trained personnel but also by the presence of doctors and dentists.

The law and international guidelines require that the assessments is conducted by trained and competent personnel.



The evaluation of age based on dental and skeletal maturity has long been a subject of research by forensic experts. For decades, various groups and forensic societies have addressed this issue, providing a hundreds of publications on the topic, as well as appropriate scientific methodologies for presenting the results of the assessments.

To ensure that the rights of minors are respected, it is important to have **forensic experts** in the evaluation team.



Here the assessment is carried out by experts with specific and **extensive training in Forensic Medicine, Anthropology, and Dentistry** (with AGFAD certifications), with the possible involvement of additional specialists.

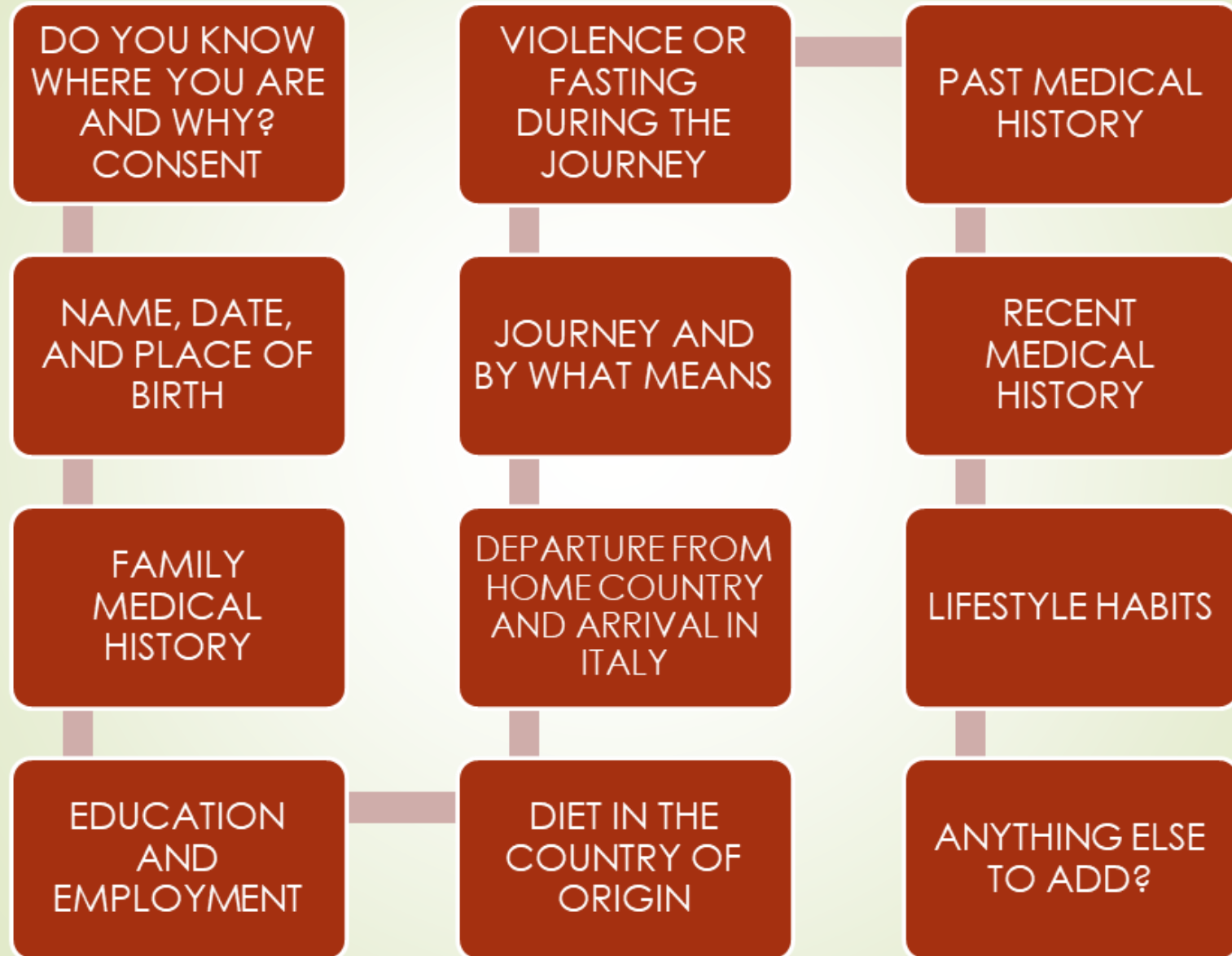
The process is conducted gradually, in a progressive manner.

The procedure is halted as soon as sufficient information for an age estimation emerges or if additional medical assessments are needed or if previously uncollected information related to age (e.g., documents) comes to light.



INTERVIEW

in the presence of a cultural mediator



MEDICAL EXAMINATION

Often, it is the **first medical examination** that unaccompanied migrants undergo since their arrival in Italy.

Identification of any conditions that could impact bone and dental age and affect the accuracy of the age estimation.



... If necessary, a referral is made for a specialized pediatric examination.

RADIOGRAPHIC ASSESSMENTS



HAND AND WRIST



Dental examination and radiographic imaging of the TEETH.



Radiographic examination of the CLAVICLES.

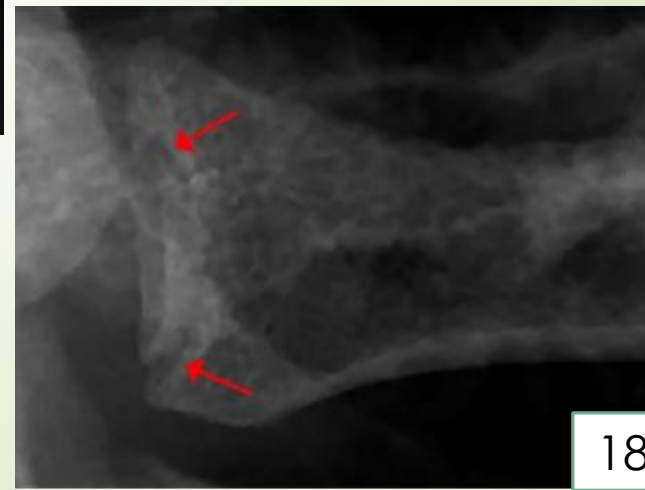


ALARA

As Low As Reasonably Achievable

JUSTIFICATION: Medical exposures must provide direct benefits to the health of the individual and the community, outweighing the potential harm that the exposure could cause to the person.

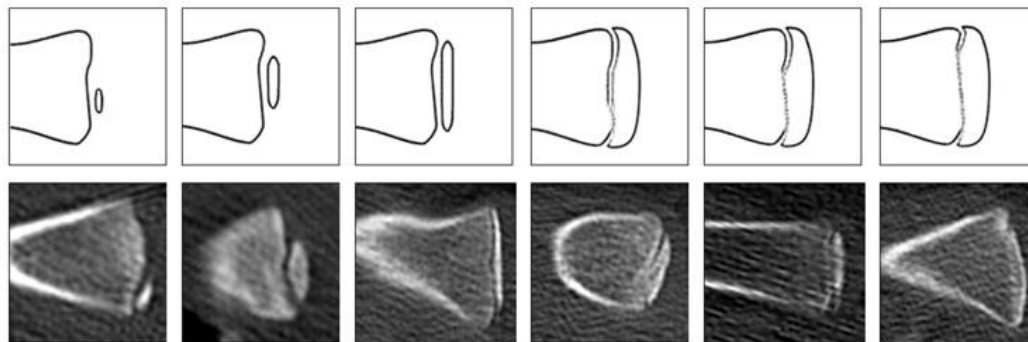
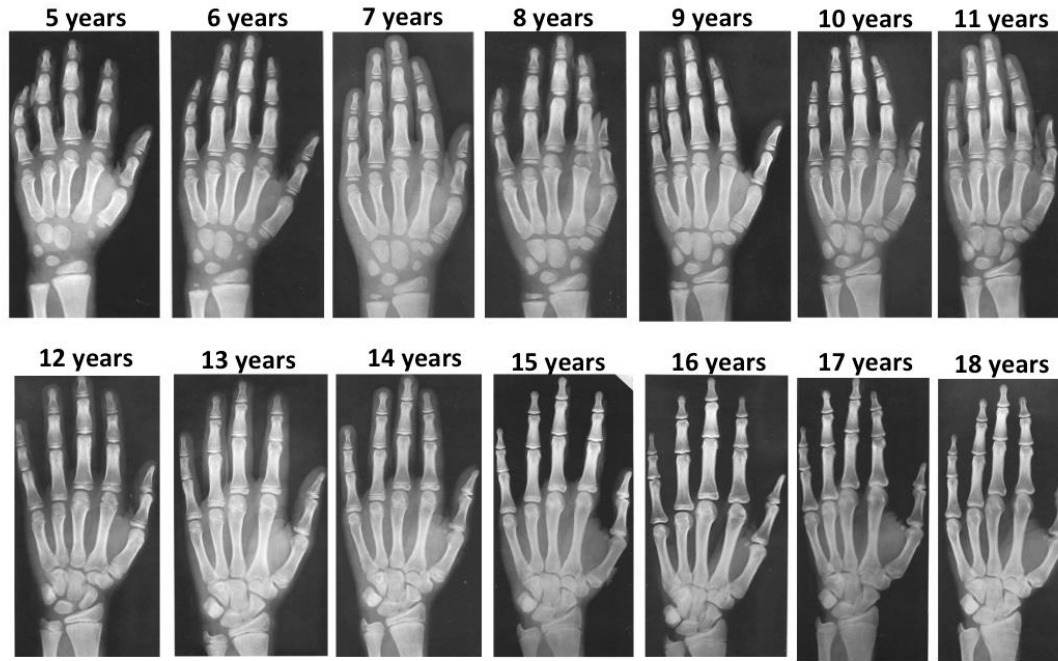
OPTIMIZATION: The doses from such exposures must be kept at the lowest reasonably achievable level, compatible with obtaining the required diagnostic information, while considering economic and social factors.



The average effective dose resulting from the completion of the full protocol is approximately 14 μSv : about 1 day of background radiation

insignificant risk

RADIOGRAPHIC ASSESSMENTS

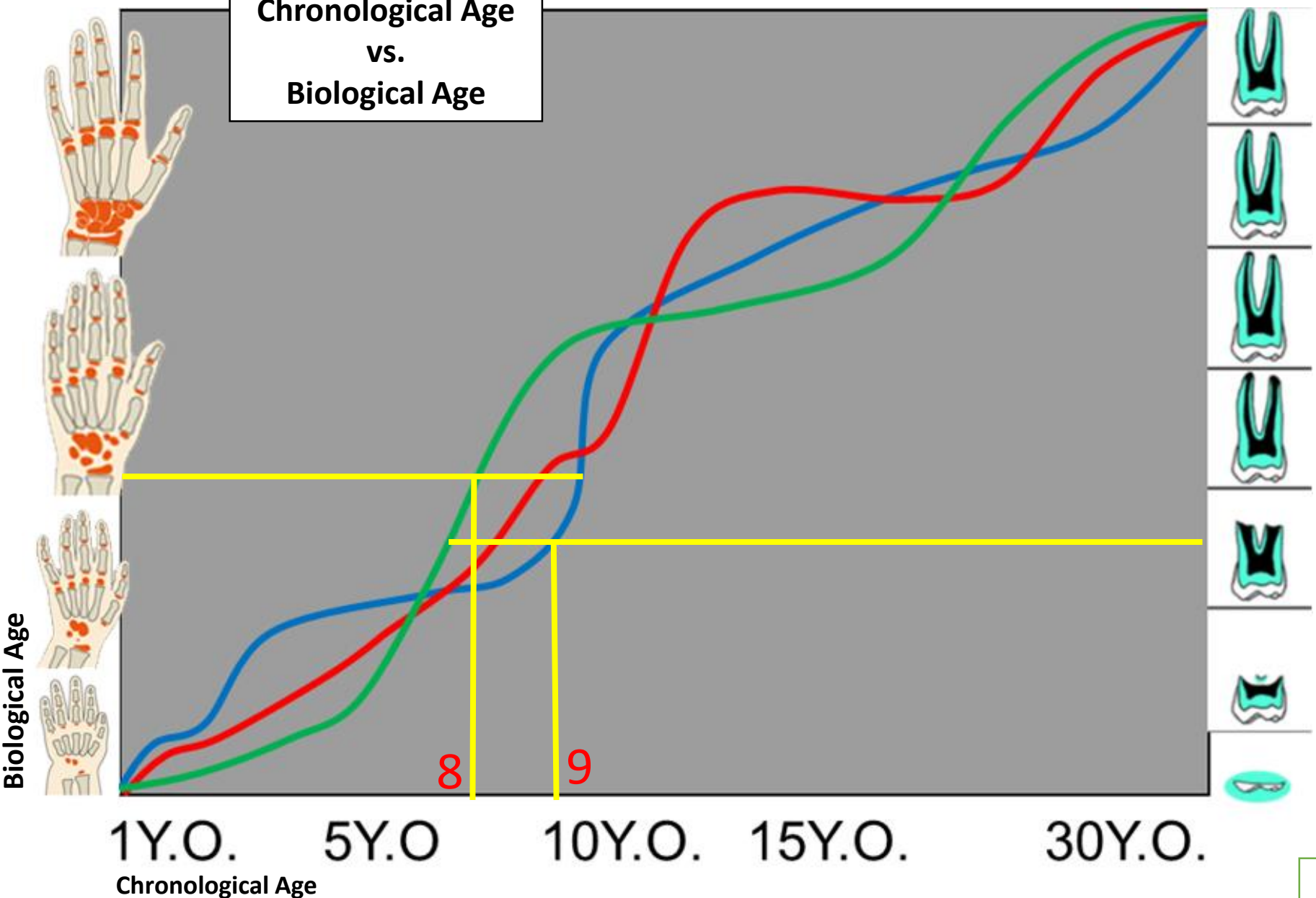


2a 2b 2c 3a 3b 3c

	Ci: initial cusp formation		
	Cco: Coalescence of cusps		R 1/4: root length less than crown length with visible bifurcatio area
	Coc: Cusp outline complete		R 1/2: root length equals crown length
	Cr 1/2: crown half completed with dentine formation		R 3/4: three quarters of root length developed with diverge ends
	Cr 3/4: crown three quarters completed		Rc: root length completed with parallel ends
	Crc: crown completed with defined pulp roof		A 1/2: apex closed (root ends converge) with wide PDL
	Ri: initial root formation with diverge edges		Ac: apex closed with normal PDL width

RADIOGRAPHIC ASSESSMENTS

Chronological Age
vs.
Biological Age



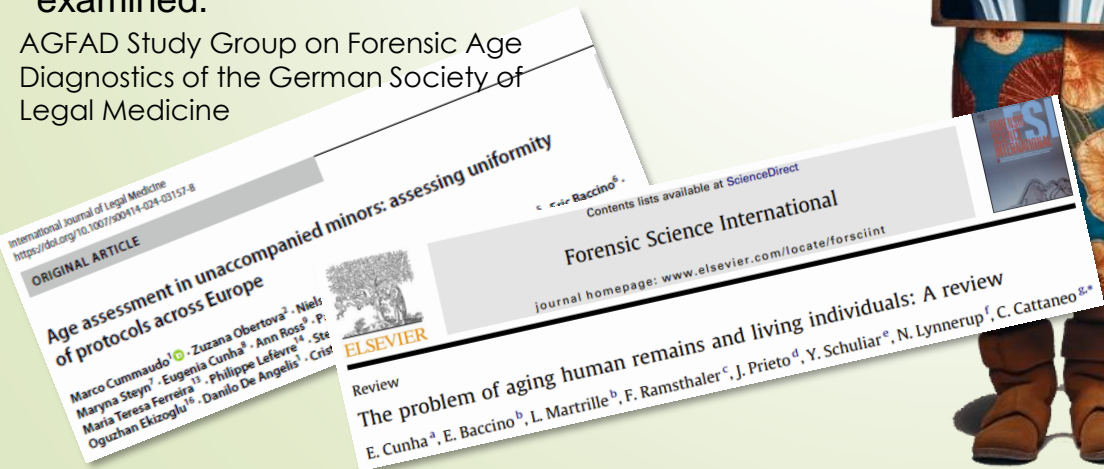
CRITICAL INTERPRETATION OF THE ASSESSMENTS

The reference studies used for age estimation should meet the following requirements:

- Adequate sample size, considering the number of age groups,
- Verified age of the subjects,
- Uniform age distribution,
- Separate analysis for both sexes,
- Clear definition of the characteristics examined,
- Detailed description of the methods used.
- Data on the reference population related to genetic/geographic origin, socioeconomic status, and health status,
- Data on sample size, mean value, and range of dispersion for each characteristic examined.



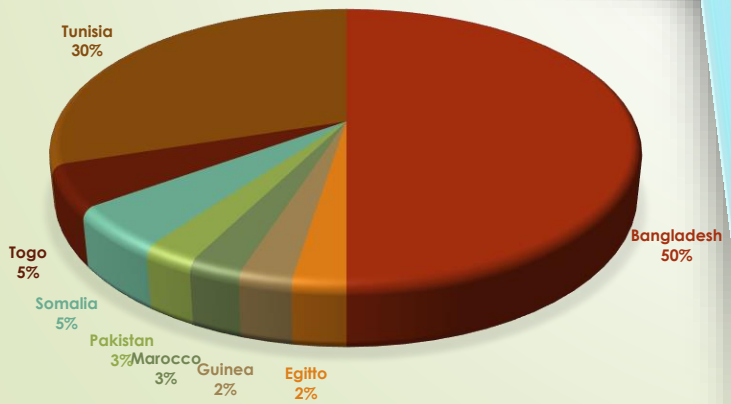
Regulations and guidelines require that the "error" of the method be known; in cases where doubt about minority age persists, it is presumed.



Review Article

Age estimation in the living: A scoping review of population data for skeletal and dental methods

Marco Cummaudo ^{a, b, c, d, e}, Danilo De Angelis ^{a, b}, Francesca Magli ^{a, b}, Giulia Minà ^a, Vera Merelli ^{a, b}, Cristina Cattaneo ^{a, b}



SKELETAL DEVELOPMENT OF THE HAND & WRIST

A Radiographic Atlas



Cree M. Gaskin, S. Lowell Kahn, J. Christopher Bertozzi, and Paul M. Bunch

OXFORD

THIRD EDITION

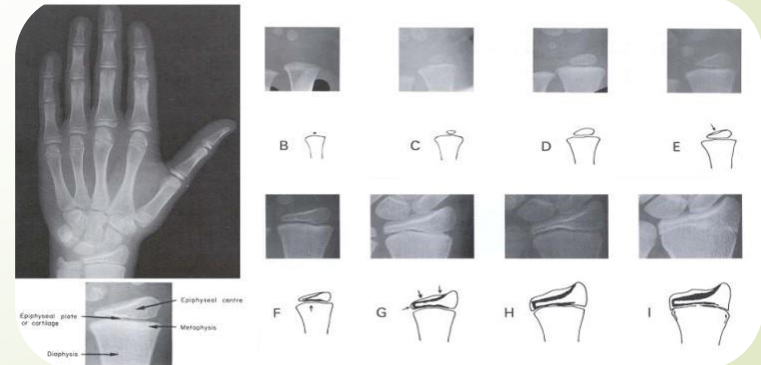
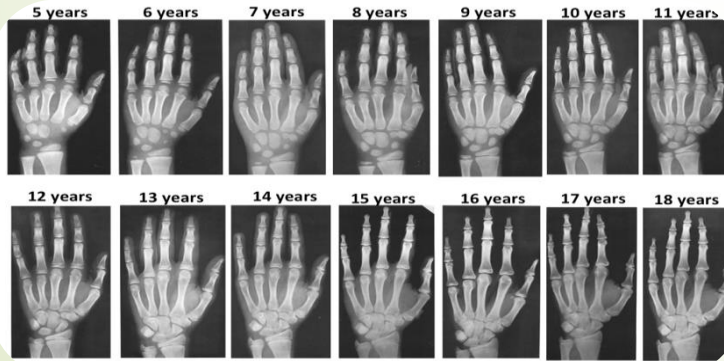
ASSESSMENT OF SKELETAL MATURITY

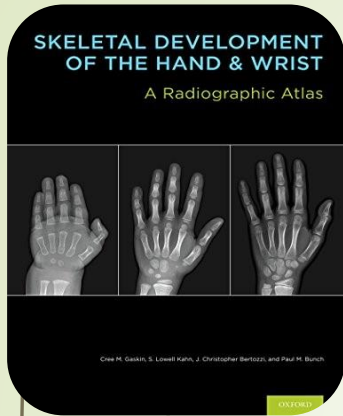
AND PREDICTION OF ADULT HEIGHT (TW3 METHOD)



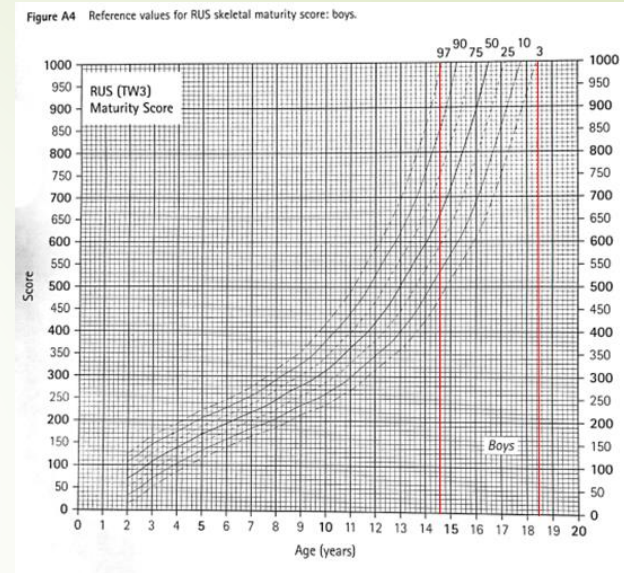
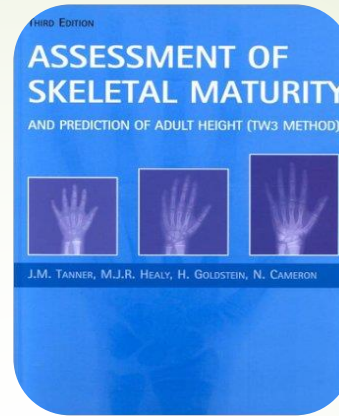
J.M. TANNER, M.J.R. HEALY, H. GOLDSTEIN, N. CAMERON

Hand/Wrist



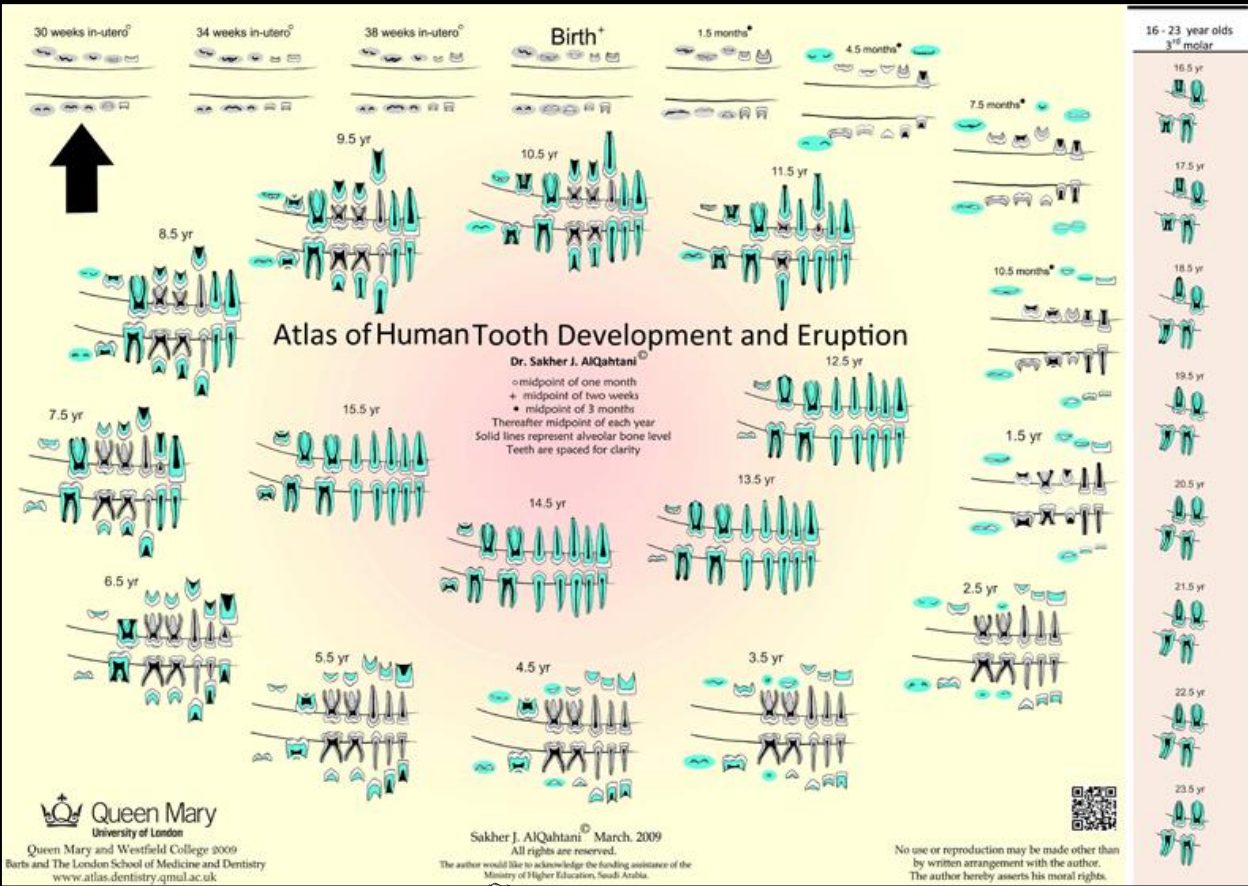


GP age category	mean	s	95% Prediction Interval	
			lower limit	upper limit
1 year and 6 months	1.61	0.30	1.00	2.23
2 years	2.03	0.38	1.24	2.81
2 years and 8 months	2.72	0.57	1.53	3.91
3 years	3.11	0.75	1.51	4.71
3 years and 6 months \downarrow	3.65	0.61	2.36	4.93
4 years \downarrow	3.90	0.59	2.68	5.12
4 years and 6 months	4.65	0.96	2.69	6.61
5 years	5.36	1.08	3.20	7.52
6 years	6.48	0.85	4.77	8.20
7 years	7.48	0.96	5.55	9.41
8 years	8.11	0.91	6.27	9.95
9 years	9.25	0.89	7.46	11.04
10 years	10.42	1.18	8.05	12.78
11 years	11.09	1.11	8.86	13.33
11 years and 6 months	11.71	1.16	9.37	14.06
12 years and 6 months	12.28	1.12	10.02	14.55
13 years	13.15	1.00	11.16	15.14
13 years and 6 months	13.66	0.98	11.68	15.64
14 years	14.44	1.05	12.33	16.55
15 years \downarrow	15.01	1.01	12.89	17.12
15 years and 6 months \downarrow	15.19	0.99	12.98	17.40
16 years	16.28	1.39	13.36	19.21
17 years	16.52	1.13	14.25	18.78
18 years	17.79	1.07	15.62	19.95
19 years	19.35	1.20	16.99	21.72



Hand/Wrist

The complete maturation of the bones in the hand and wrist is **NOT an indicator** of having reached the age of majority.



Description of Moorrees' stages (1963) used to identify tooth developmental stages of multirooted teeth

	<p>Cr:</p> <p>initial cusp formation</p>		
	<p>Cco:</p> <p>Coalescence of cusps</p>		<p>R 1/4:</p> <p>root length less than crown length with visible bifurcation area</p>
	<p>Coc:</p> <p>Cusp outline complete</p>		<p>R 1/2:</p> <p>root length equals crown length</p>
	<p>Cr 1/2:</p> <p>crown half completed with dentine formation</p>		<p>R 3/4:</p> <p>three quarters of root length developed with diverge ends</p>
	<p>Cr 3/4:</p> <p>crown three quarters completed</p>		<p>Rc:</p> <p>root length completed with parallel ends</p>
	<p>CrC:</p> <p>crown completed with defined pulp roof</p>		<p>A 1/2:</p> <p>apex closed (root ends converge) with wide PDL</p>
	<p>Ri:</p> <p>initial root formation with diverge edges</p>		<p>Ac:</p> <p>apex closed with normal PDL</p>

Teeth



Teeth: It is reported in the scientific literature that minors can present with a fully developed lower third molar. To cite just a few scientific articles: Liversidge 2010, 2017.



TABLE 4—Empirical probabilities (%) of an individual being at least 18 years of age based on the grade of third molar formation.^a

Group	Grade of Formation				
	D	E	F	G	H
	Maxilla				
Males	15.9	27.8	44.0	46.8	85.3
Females	9.7	28.4	50.4	63.3	89.6
	Mandible				
Males	6.1	69.4	40.5	56.0	90.1
Females	11.3	27.4	43.2	69.8	92.2

This means that, according to the law, if the third molars are not fully developed and there are no doubts about severe conditions that could have delayed development, the individual must be considered a minor. If the interpretation of the word "doubt" is understood as "beyond any reasonable doubt," the individual can still be considered a minor even if the third molars are fully developed, as this situation can also occur in minors, as reported in the scientific literature.

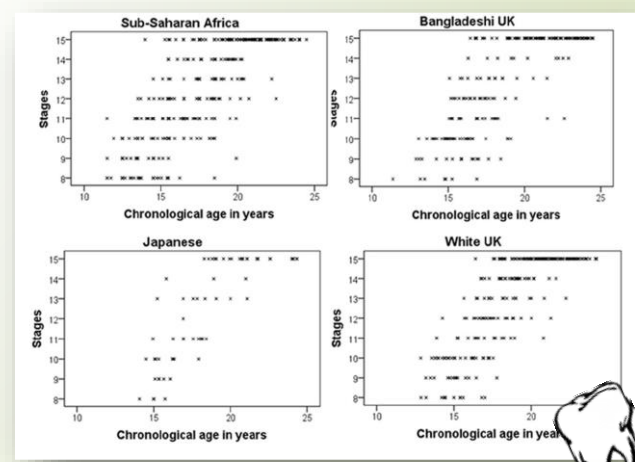
Mincer <i>et al.</i> ⁶	USA	0.901
Solari <i>et al.</i> ⁷	USA Hispanic	0.887
Gunst <i>et al.</i> ¹³	Belgium	0.948
Olze <i>et al.</i> ⁸	Japan	1.000
Arany <i>et al.</i> ⁹	Japan	0.98
De Sallvia <i>et al.</i> ¹⁰	Italy	0.968
Rozkavcová <i>et al.</i> ¹⁴	Czech Republic	0.977
Garamendi <i>et al.</i> ¹⁶	Morocco	0.714
Preito <i>et al.</i> ¹¹	Spain	0.913
Blankenship <i>et al.</i> ¹⁹	USA Black	0.927
	USA White	0.899
Mcini <i>et al.</i> ¹⁷	Austria	0.991
Cameriere <i>et al.</i> ¹⁹	Italy	0.96
Martín-de las Heras <i>et al.</i> ¹⁸	Spanish-Galicia	
	Spanish-Ceuta	
	Magrebian-Ceuta	
Liversidge ²	UK White	0.927
	UK Bangladeshi	0.927
	SA Black	0.992
	SA Cape	1.000
Lee <i>et al.</i> ²¹	Korea	1.000
Kasprer <i>et al.</i> ²²	USA Hispanics	0.864



Teeth

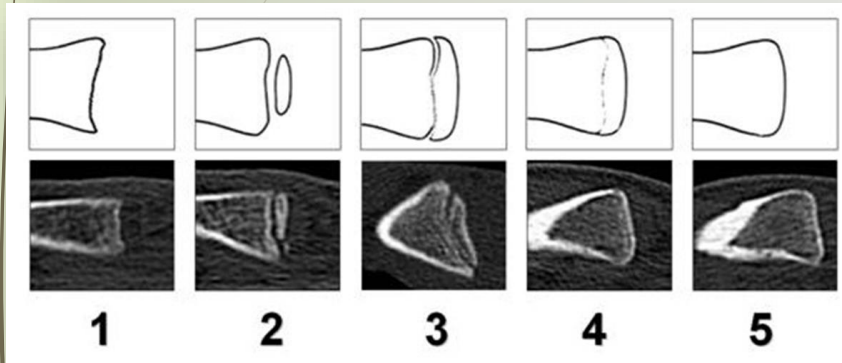


If there is still a probability of being a minor, it means that there is reasonable doubt.

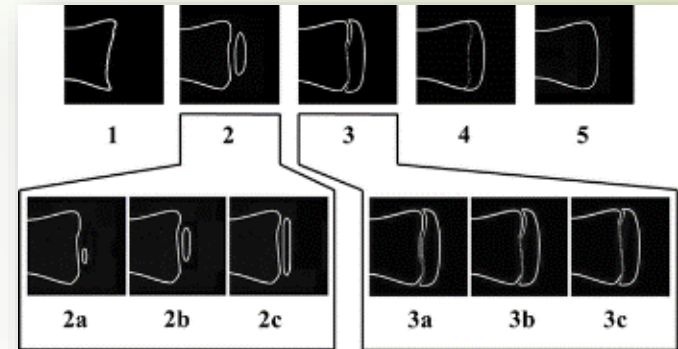


Assessment of the degree of ossification of the medial end of the clavicle.

Schmeling, 2004

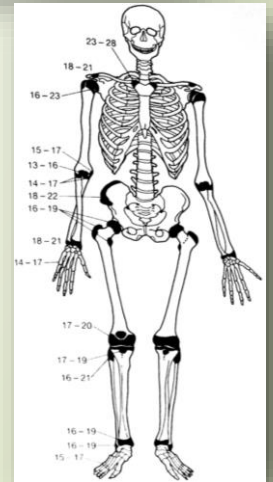


Wittschieber, 2014



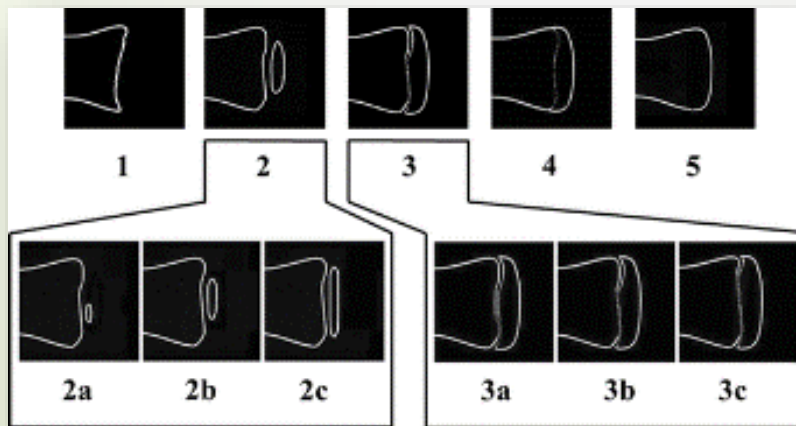
CLAVICLE

Clavicle: It is the last bone in the skeleton to complete its development.



Clavicle: The process of ossification of the medial clavicular epiphysis. It is reported in the scientific literature that no minor shows signs of advanced stages of clavicle ossification. Beyond any reasonable doubt, according to scientific evidence, starting from stage 4 of Schmeling or stage 3c of Wittschieber, the evaluated individual is certainly older than 18 years (older than 19 if stage 3c, and older than 21 if stage 4).

CLAVICOLE

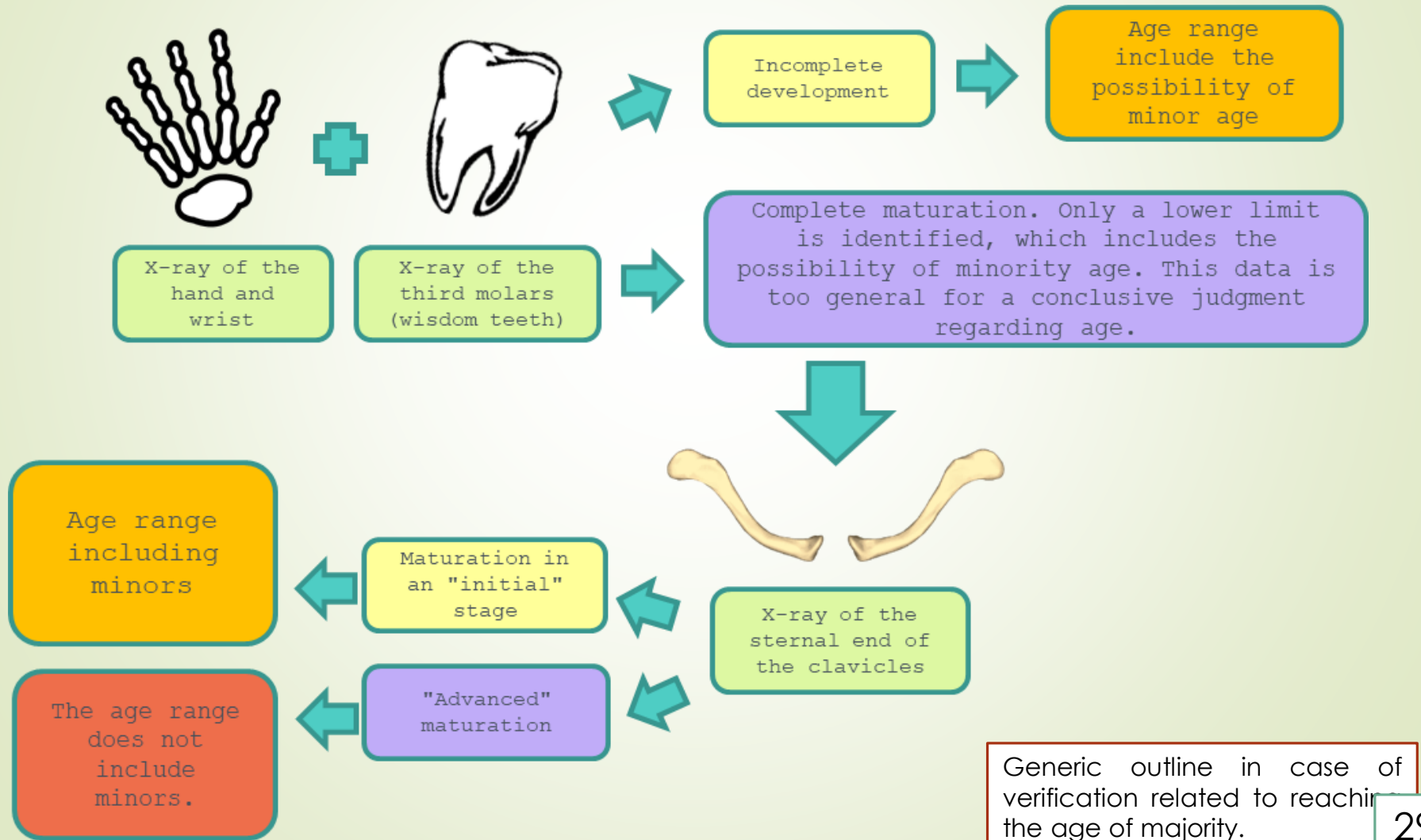


Stage	Sex	n	Min-max
1	Male	12	10.7-14.9
	Female	4	12.1-15.4
2	Male	16	15.0-20.4
	Female	8	14.1-18.4
2a	Male	4	15.0-16.5
	Female	4	14.8-18.4
2b	Male	10	16.1-20.4
	Female	3	14.1-15.8
2c	Male	2	17.4-20.2
	Female	1	17.9
3	Male	108	16.4-36.5
	Female	53	15.5-26.5
3a	Male	24	16.4-22.3
	Female	12	15.5-23.3
3b	Male	31	17.6-36.5
	Female	15	16.4-23.3
3c	Male	53	19.0-30.0
	Female	26	19.4-26.5
4	Male	180	21.6-40.5
	Female	65	21.1-37.3
5	Male	20	26.6-40

Wittschieber, 2014

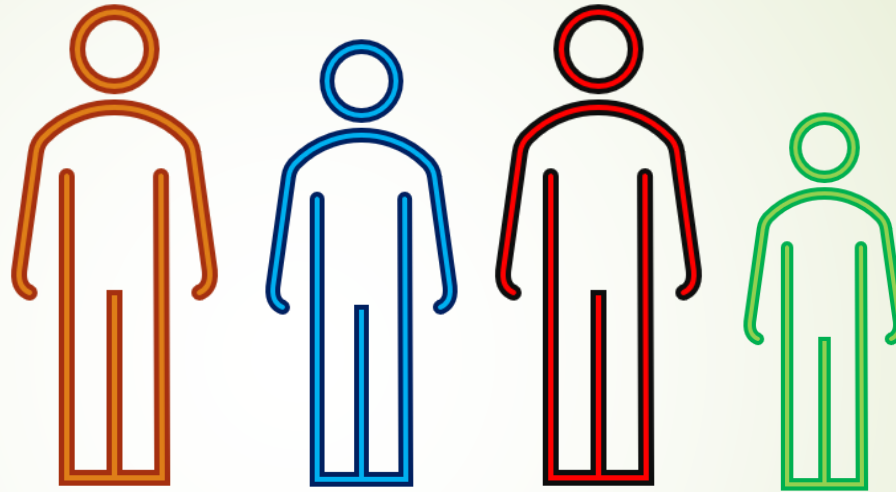
CRITICAL INTERPRETATION OF THE ASSESSMENTS

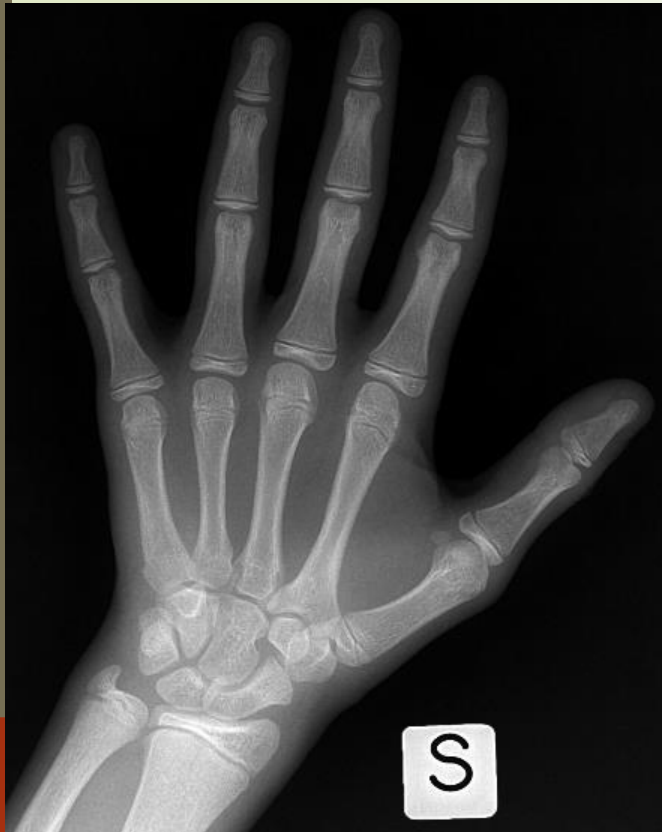
Assessment of the degree of bone and dental development (biological age) and the consequent identification of the chronological/civil age range, with particular attention to the lower age limit...

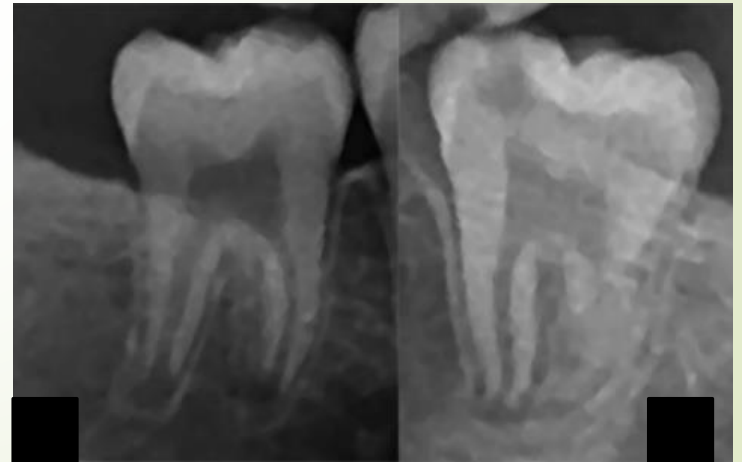


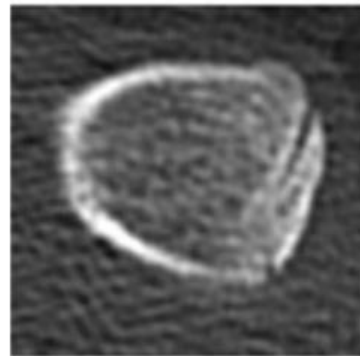
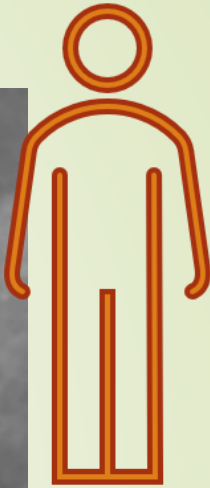
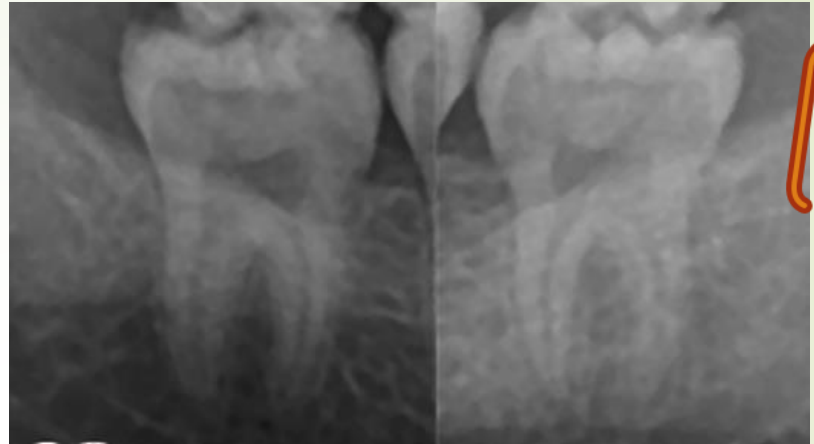
Generic outline in case of verification related to reaching the age of majority.

4 Examples

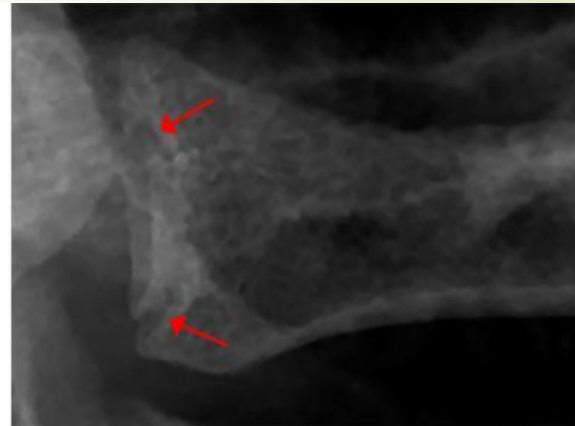


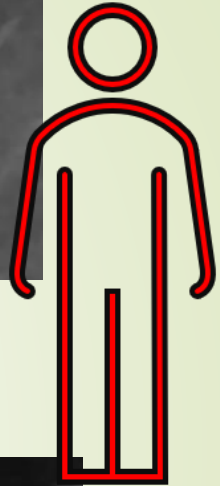






Stage 3a





SOME FINAL CONSIDERATIONS:

- Age estimation often focuses on determining whether a person has reached adulthood.
- It helps identify minors, ensuring they receive the rights reserved for their age group.
- Accurately distinguishing minors prevents the risk of treating them as adults.
- Used methods must conform to national and international laws and follow scientific guide lines (forensic).
- It's acceptable for some young adults to be treated as minors, but misjudging a minor as an adult can lead to denying their fundamental rights.
- By using a careful approach, we protect the rights and dignity of fragile individuals who need it most.





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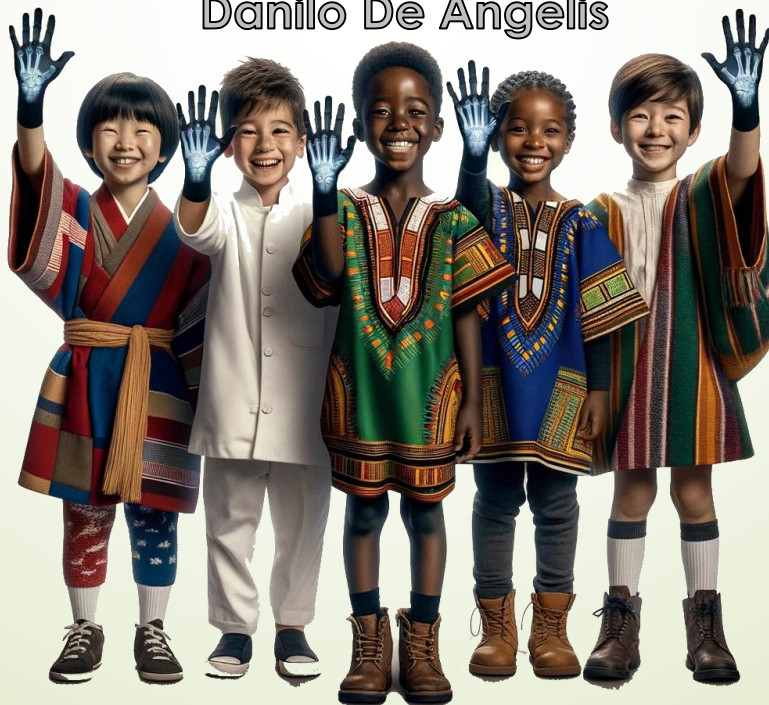


4, 5 and 6 September 2024

6th international EFJCA Conference

Children as victims: Unaccompanied minors and medicolegal assessment of fragility. The age estimation.

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