

CLINICAL CASES

Expertise - Innovation - Prevention



+400 USERS

of the medical device pOpmètre®

DIFFERENT SPECIALISTES

- Hospitals & Clinics
- General Practitioners
- Cardiologists
- Diabetologists
- Nephrologists
- Somnologist



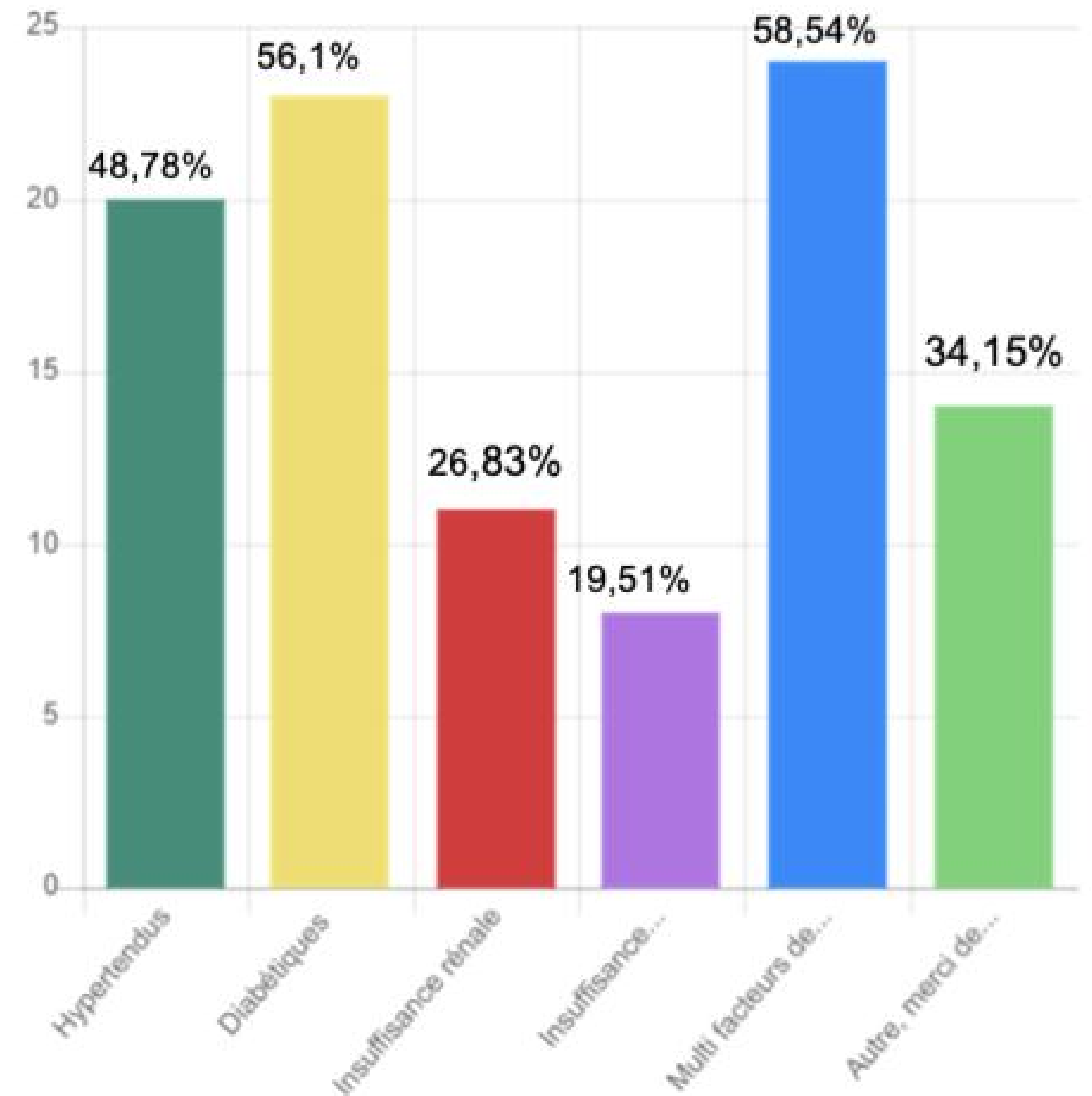


FOR WHAT TYPE OF PATIENTS Do you carry out pOpmètre® measurement ?

The patients most concerned by pOpmeter measurements are those most at risk of cardiovascular disease as well as diabetics and hypertensives.

For diabetics it is the impact of glycation on vascular remodeling that is of interest as well as ABI.

For hypertensives, the risk of organ damage is studied as well as central pressure in order to best adjust treatments.





THE MAIN USES OF THE POPMETRE® ?

- Earlier and more precise assessment of cardiovascular risks.
- Better stratification of « at risk » patients.
- Educational tools to improve caregiver/patient communication and empower patient in behavior changes decisions.
- Personalization of the treatment and prevention approach.





ADD ON POPMETRE FOR HYPERTENSIVE PATIENTS

- PWV measurement : 2018 ESC(1) and 2023 ESH(2) guidelines to prevent the risk of organ damages and identify most at risk patients.
- Central pressures measurement allows us to better understand the reality of the cardiac load (3).
- A central pulse pressure (the difference between systolic and diastolic blood pressure at the aorta and is an indicator of arterial stiffness) above 50 mmHg 4 is generally considered elevated and may indicate an increased risk of cardiovascular disease. And suggest a significant increase in the workload of the heart and a decrease in the efficiency of blood perfusion in peripheral organs and tissues. This may require further assessment to identify the underlying cause of increased arterial stiffness and to implement strategies to reduce cardiovascular risk, such as lifestyle modification, pressure control blood pressure.

1. <https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-6/ESH-ESC-Guideline-for-the-management-of-hypertension-Title-ESH-ESC-Guideline>
2. https://www.portailvasculaire.fr/sites/default/files/docs/2023_esh_guidelines_for_the_management_of_arterial.271_0.pdf
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8029873/>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3164777/>

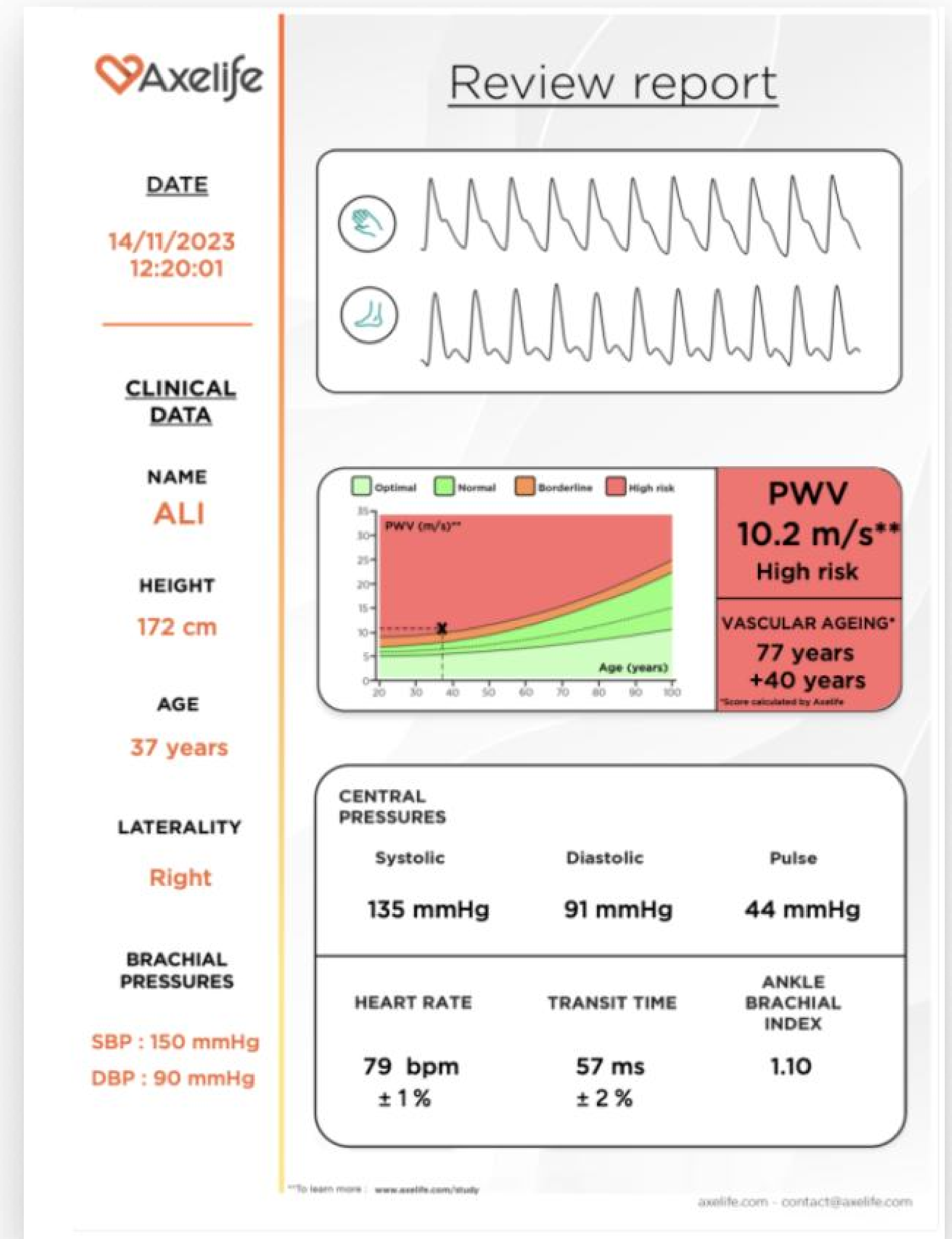


PATIENT CASE N°1 - 37YO

- Family history of cardiovascular diseases
- Overweight
- Smoker (>20 cigarettes/day)
- No known cholesterol or diabetes
- Known but untreated hypertension

- The PWV measured is more than 10 m per second which places the patient at “high risk”.
- His corrected central pressure is a little better than the peripheral and takes him from stage 1 hypertension to “normally high” blood pressure.
- The patient is a smoker without physical activity

- The patient, already aware of the cardiovascular risks linked to his family history and his overweight and his addiction to tobacco, was particularly sensitive to the notion of arterial age.
- He engaged in a process of self-measurement of blood pressure and a smoking cessation with resumption of physical activity.





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PATIENT CASE N°1

« I knew I had to be careful but I was putting it off until later since I'm 37 years old. Blood pressure seemed abstract to me but telling myself that my arteries are 77 years old made me realize that I need to change ! »

Ali – Patient

Interventions Using Heart Age for Cardiovascular Disease Risk Communication: Systematic Review of Psychological, Behavioral, and Clinical Effects

Carissa Bonner¹; Carys Batcup¹; Samuel Corneli¹; Michael Anthony Fajardo¹; Anna L. Hawkes²; Lyndal Trevena¹; Jenny Doust³



Calculate your heart age

Your heart age gives you an idea of how healthy your heart is. This calculator will compare your real age to your heart age by asking you questions about your health. You'll also find out how to improve your heart age by making some healthy lifestyle changes.



Heart Age Calculator

Could you be at risk of heart disease? Get your estimated heart age

Smoker men	SBP	Absolute risk
91-94	120-139	12%
88-91	130-139	14%
76-80	140-159	4%
73-76	160-179	1%
64-66	180-199	0%
77-80	200-219	1%
72-76	220-239	1%
65-69	240-259	0%
76-79	260-279	0%
73-76	280-299	0%
65-69	300-319	0%

Conclusions

Informing patients about their CVD risk expressed as the new Heart Age tool results in a reduction in their CVD risk higher than the one observed when the Framingham REGICOR risk score was used.

Effectiveness of the Heart Age tool for improving modifiable cardiovascular risk factors in a Southern European population: a randomized trial

Angel A Lopez-Gonzalez, Antoni Aguiló, Margalida Frontera, Miquel Bannasar-Veny, Irene Campos, Teofila Vicente-Herrero, Matias Tomas-Salva, Joan De Pedro-Gomez, Pedro Tauler

European Journal of Preventive Cardiology, Volume 22, Issue 3, 1 March 2015, Pages 389-396, <https://doi.org/10.1177/2047487313518479>

Published: 29 August 2020 Article history

Debate | Open access | Published: 07 February 2018

Should heart age calculators be used alongside absolute cardiovascular disease risk assessment?

Carissa Bonner, Katy Bell, Jesse Jansen, Paul Glasziou, Les Irwin, Jenny Doust & Kirsten McCaffery

BMC Cardiovascular Disorders 18, Article number: 19 (2018) | Cite this article

10k Accesses | 30 Citations | 79 Altmetric | Metrics

Conclusion

Interactive heart age tools may be helpful as a communication tool to initiate lifestyle change to reduce risk factors. However, absolute risk should be used instead of heart age to enable informed decision making about medication, to avoid unnecessary treatment of low risk people. Evidence-based decision aids that improve patient understanding of absolute risk should be considered as alternatives to heart age calculators for lifestyle and medication decisions.



ADD ON VASCULAR AGE - ARTERIAL AGE : CLINICAL RELEVANCE ?

Numerous clinical studies demonstrate the importance of arterial stiffness.

1. <https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-6/ESH-ESC-Guideline-for-the-management-of-hypertension-Title-ESH-ESC-Guideline>
2. https://www.portailvasculaire.fr/sites/default/files/docs/2023_esh_guidelines_for_the_management_of_arterial.271_0.pdf
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8029873/>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3164777/>

VASCULAR AGE

It is data that is universally understood by patients.(5)



(5)<https://pubmed.ncbi.nlm.nih.gov/24491403/>



GROUPE A

Have received dietary advice.



Deterioration of vascular age.

+4,5 years



GROUPE B

Have received dietary advice and their cardiovascular risk in the form of arterial age.



Improvement in vascular age.

-1,5 years

Four times more people quit smoking in this group.



PATIENTE N°2 - 58yo

- Treated but uncontrolled grade 3 hypertension (compliance problem)
- Former smoker - obese (BMI 35)
- High cholesterol - T2DM

- The PWV measured is more than 20 m per second which places the patient at “high risk”.
- Central pressure confirms the diagnosis of hypertension and especially pulse pressure above 50 mmHg alerts to structural damage at the vascular level. Arterial stiffness and high blood pressure put the patient at risk of organ damage.

- The priority is the adaptation of treatments towards a family of antihypertensives whose effectiveness on arterial stiffness is greater.
- The patient is made aware of the importance of compliance and uses an alarm on his smartphone to think about his treatment. Given the high LDL cholesterol, the prescription of antihypercholesterolemic drugs is also initiated - it will also act on arterial stiffness to reduce it.
- Arterial age is an opportunity to resume communication with the patient about the risks involved and the behavioral changes to initiate - the patient is sent for a calcium score and to a dietitian to initiate a change in diet towards a Mediterranean diet.



Rapport d'examen

DATE

13/11/2023
10:49:38

DONNEES CLINIQUES

NOM

JI HEXAR

TAILLE

171 cm

AGE

36 ans

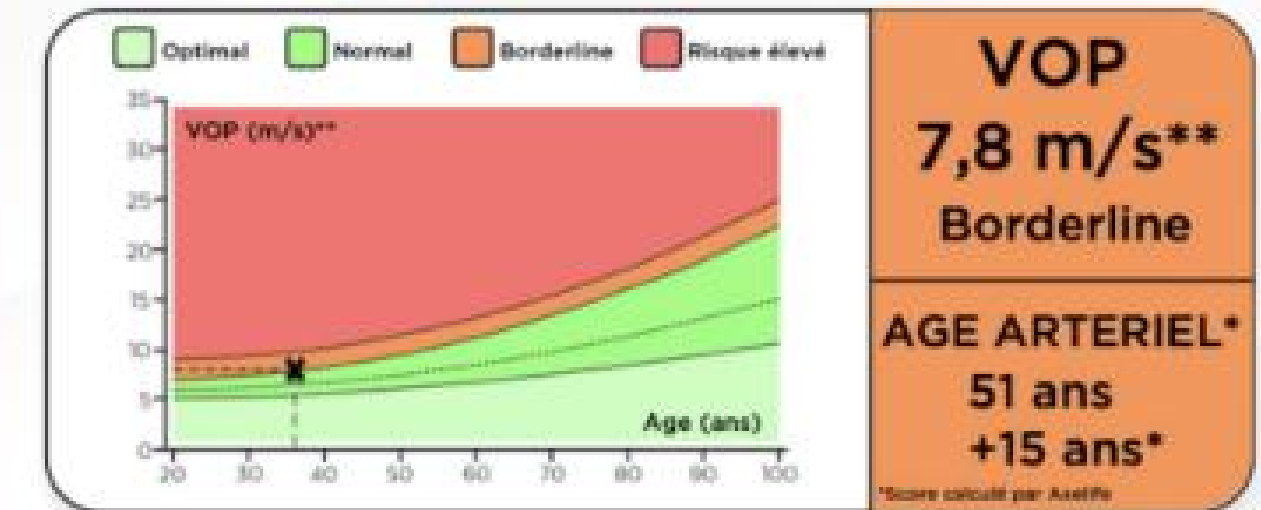
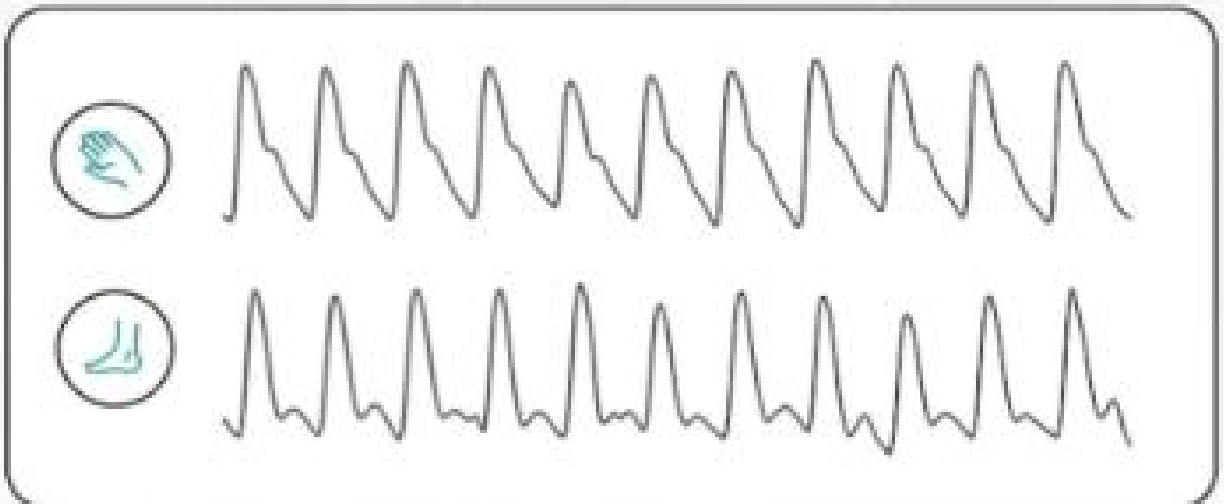
LATERALITE

Gauche

PRESSIONS BRACHIALES

PAS : 120 mmHg

PAD : 80 mmHg



PRESSIONS CENTRALES

Systolique

109 mmHg

Diastolique

81 mmHg

Pulsée

28 mmHg

FRÉQUENCE CARDIAQUE

86 bpm
± 2 %

TEMPS DE TRANSIT

74 ms
± 2 %

INDEX DE PRESSION SYSTOLIQUE

1,12

**Pour en savoir plus : www.axelife.com/study

axelife.com - contact@axelife.com



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PATIENT CASE N°2

« While I sometimes had the impression of being in a dead end with some of my patients in my cardiovascular consultation, the use of the pOpmetre and the concept of arterial age allow renewed exchanges, easier, more motivating for everyone. Telling them that we have the age of our arteries, that we can now measure it and why it is important to do so, but also telling them that we can improve it... it's a game changer! »

Pr A - cardiologist



ASSOCIATED SCIENTIFIC PUBLICATION

“Outpatient measurement of arterial stiffness in patients with type 2 diabetes and obesity”

POPULATION

- Obese without T2DM
- Obese with T2DM
- T2DM without obesity
- Healthy control

CONCLUSION

Outpatient-measured ftPWV was correlated with age, SBP, and ABI. It was higher in patients with T2DM and obesity compared with healthy controls. The highest ftPWV was observed in patients with both T2DM and obesity.

[Lien de la publication](#)



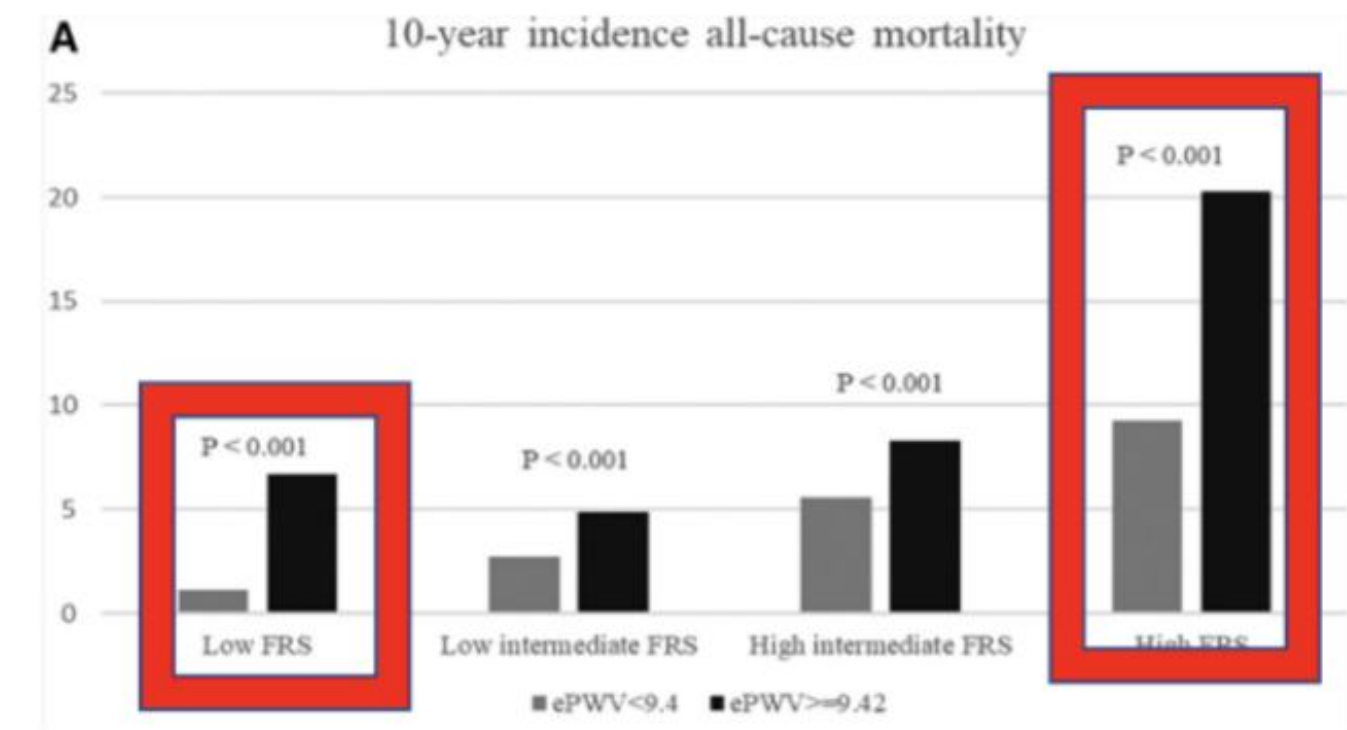
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ADD ON

Arterial stiffness impact on framingham's score

Ten-year incidence rate by estimated pulse wave velocity (ePWV; <9.4 m/s=low and ≥ 9.4 m/s=high) and Framingham Risk Score (FRS) category for (A) all- cause mortality, (B) fatal stroke or death from coronary heart disease (cardiovascular mortality) and (C) fatal or non-fatal stroke, death from non-fatal coronary artery disease or myocardial infarction (composite criterion). Low (10-year estimated risk of the broader composite cardiovascular endpoint $< 10\%$), low intermediate ($10\% \leq$ and $< 15\%$), intermediate-high ($15\% \leq$ and $< 20\%$), or high ($\geq 20\%$).

TWO CARDIOVASCULAR RISK PROFILES
PARTICULARLY IMPACTED BY THE MEASUREMENT
OF PWV :





PATIENT CASE N°3 36yo

- No cardiovascular risk factors
- Slightly overweight
- No physical activity
- Diet mainly based on processed foods and a lot of soda
- The PWV measured is on the borderline zone for this patient.
- No specific risk factors but “bad” lifestyle
- The patient is made aware through the arterial age measured at 51 years (+15 years) and becomes aware that without being pathological his behaviors put him on the wrong path.
- He clicks with the measure and wants to initiate changes
- He is aware of the importance of adopting a healthy diet and taking up physical activity.



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JI HEXAR

TAILLE

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AGE

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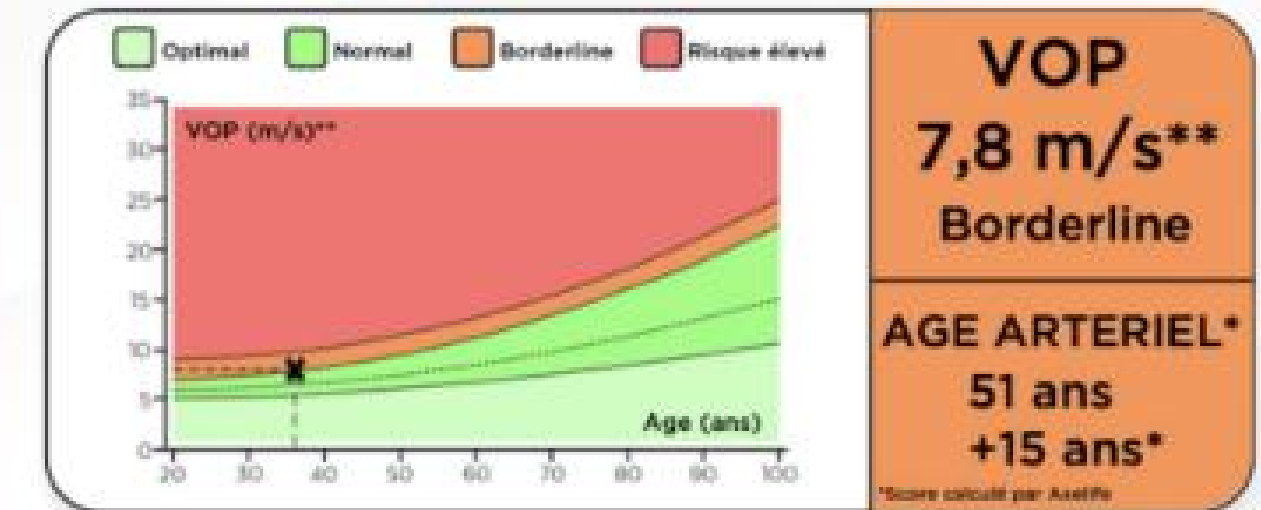
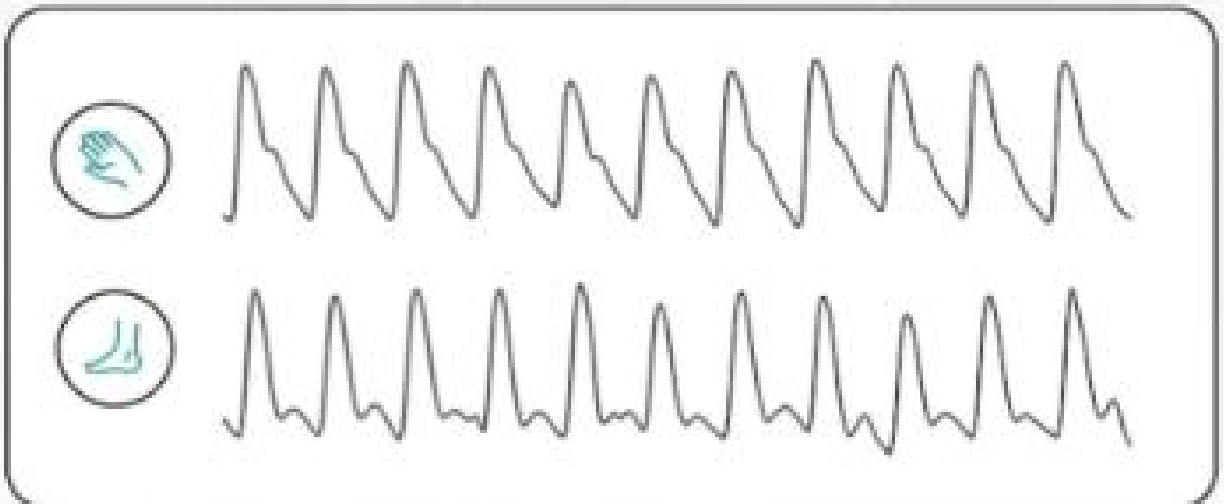
LATERALITE

Gauche

PRESSIONS BRACHIALES

PAS : 120 mmHg

PAD : 80 mmHg



PRESSIONS CENTRALES

Systolique	Diastolique	Pulsée
109 mmHg	81 mmHg	28 mmHg

FRÉQUENCE CARDIAQUE

86 bpm
± 2 %

TEMPS DE TRANSIT

74 ms
± 2 %

INDEX DE PRESSION SYSTOLIQUE

1,12

**Pour en savoir plus : www.axelife.com/study

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CAS PATIENT N°3

"As a general practitioner, I follow my patients over time. I use pOpmeter on all types of patients even if I specialize in athletes. It is very satisfying to see the progress on PWV, and therefore arterial age, which occurs quickly during changes in health and diet behavior!"

Dr G - GP



ASSOCIATED SCIENTIFIC PUBLICATION

“MEASURING ARTERIAL STIFFNESS WITH POPMÈTRE® IN
CARDIAC REHABILITATION PROGRAM”

Hasan Obeidet et al.

December 2016

POPULATION

- CVD subjects undergoing physical activity program
- Coronary artery disease
- Valvular
- Heart failure
- Other

RESULTS

PWV decreased from 9.16 ± 3.0 to 8.39 ± 2.5 m/s ($p < 0.008$). We found a positive correlation with age ($r = 0.38$ $p < 0.0003$) and inverse correlation with maximal workload ($r = -0.34$ $p < 0.001$) and 6MWT ($r = -0.22$ $p < 0.003$). Maximal physical capacity and 6MWT correlated with PWV measured with pOpmetre, and a current CR program seems to improve the arterial stiffness in a cardiac population.

[Link of the study](#)

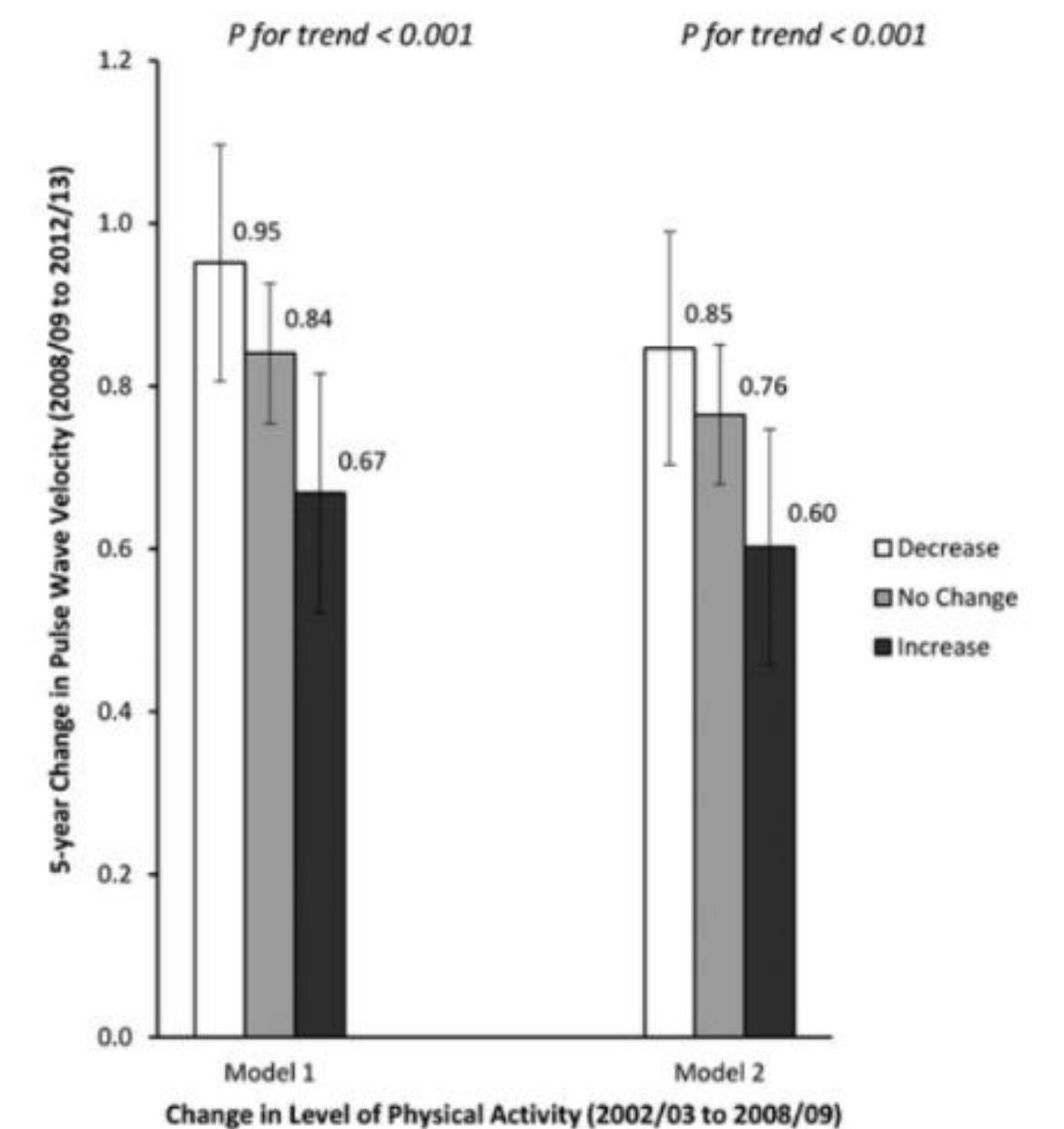




ADD ON PHYSICAL ACTIVITY

Physical activity is associated with reduced cardiovascular disease risk, mainly through effects on atherosclerosis. Aortic stiffness may be an alternative mechanism. We examined whether patterns of physical activity and sedentary behavior are associated with rate of aortic stiffening.

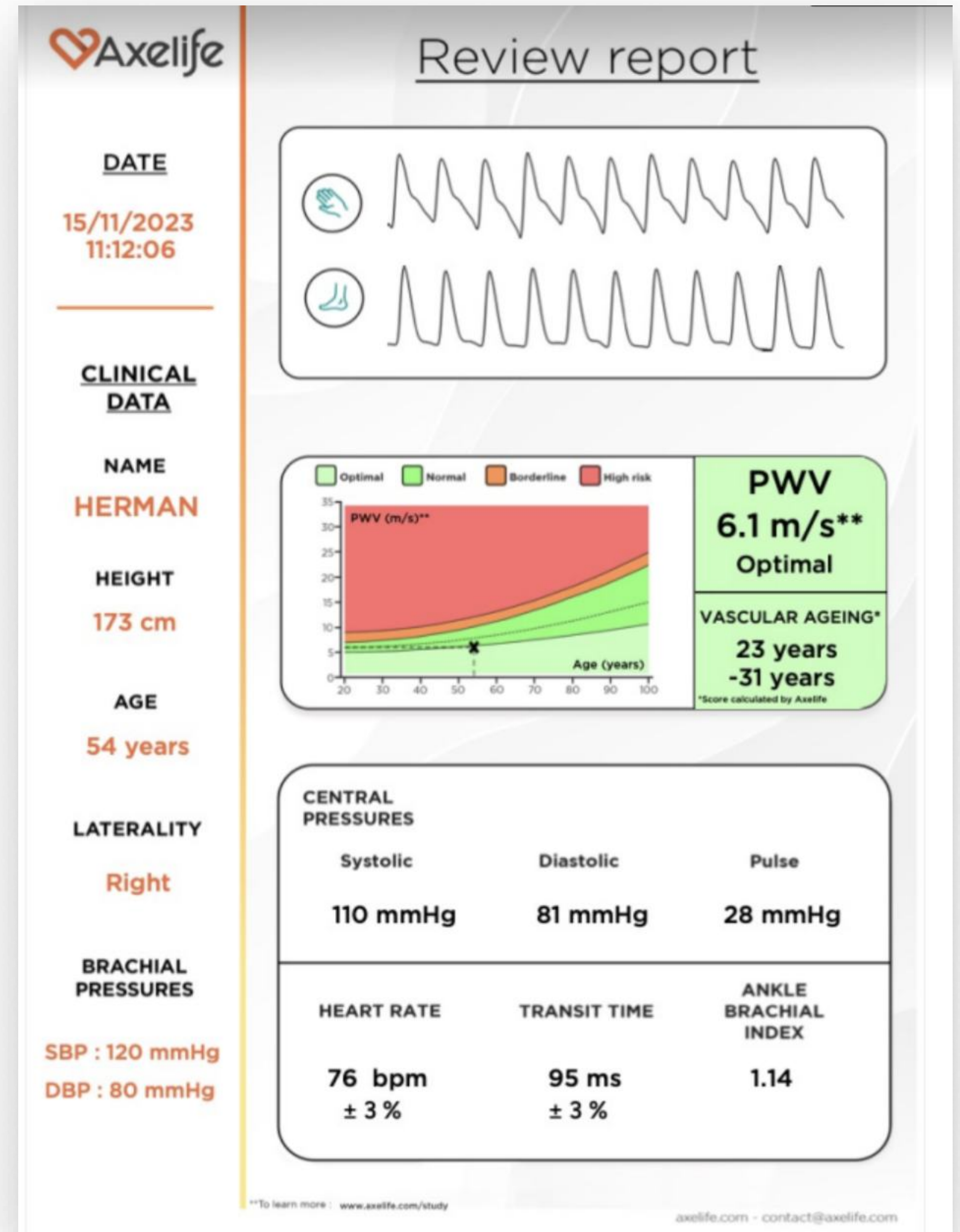
Conclusions : Higher levels of moderate-to-vigorous physical activity and avoidance of sedentary behavior were each associated with a slower age-related progression of aortic stiffness independent of conventional vascular risk factors.





PATIENT CASE N°4 54yo

- Patient aged 54
- No risk factors
- Good diet
- Sporty
- The PWV measured is on the optimal zone for this patient.
- The patient is comforted in his lifestyle, diet and sport.





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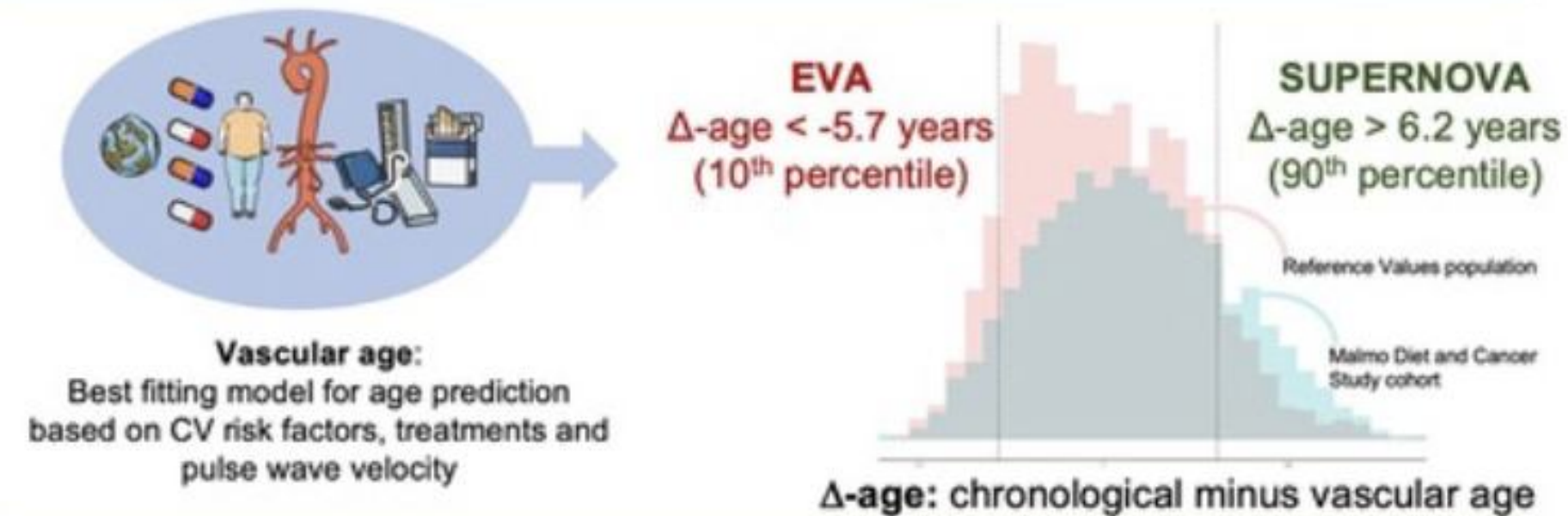
PATIENT CASE N°4

« It's awesome ! It's so satisfying and motivating. Usually I go to the doctor and he just tells me that everything is normal... that's good, but I've always been doing sports, I'm careful about what I eat, I've never smoked and I almost never drink... it's cool to see that these lifestyle choices make me better than "just normal". When I tell my wife that I'm 23... »

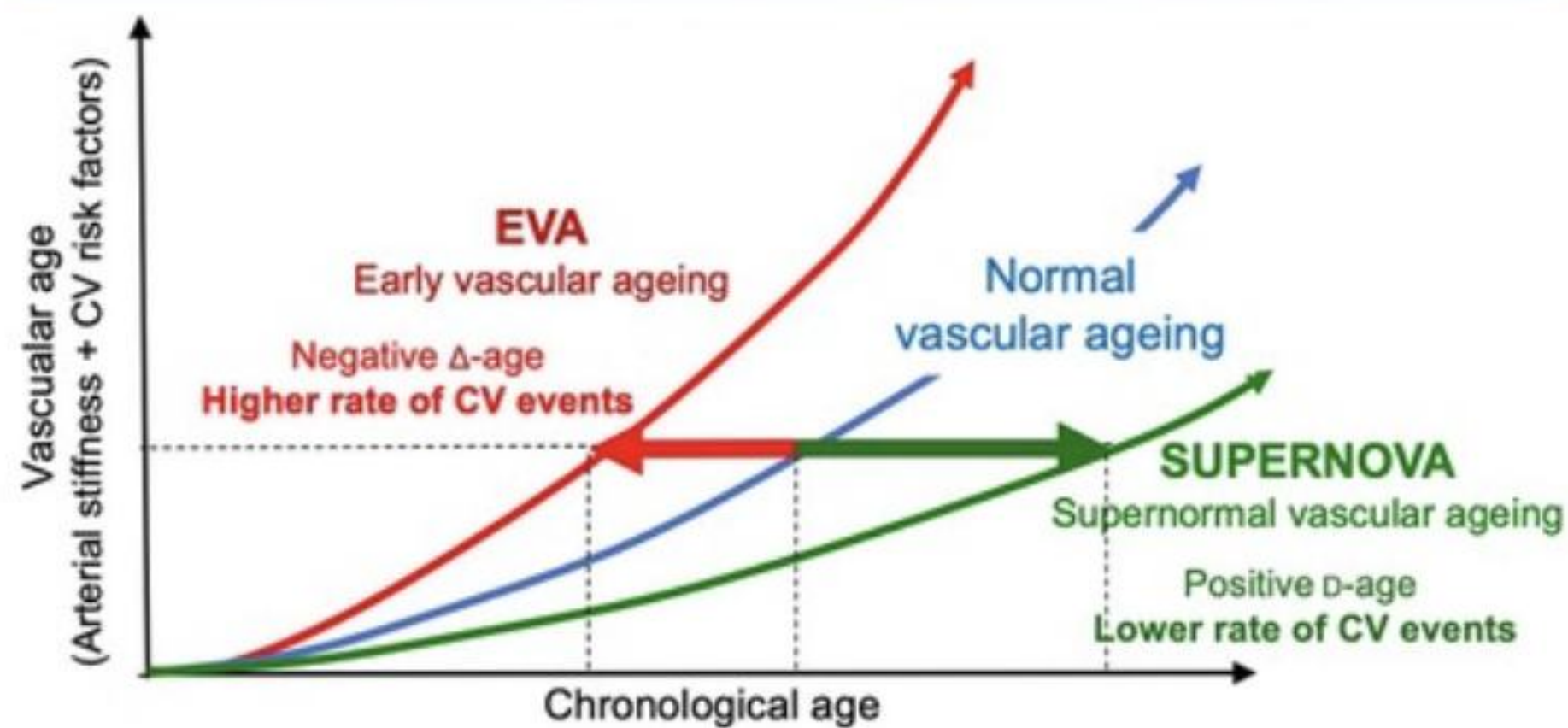
H - Patient

Extreme vascular ageing phenotypes: EVA and SUPERNOVA

Definition (Reference Values for Arterial Stiffness Collaboration population)



Clinical validation (Malmö Diet and Cancer Study cohort)



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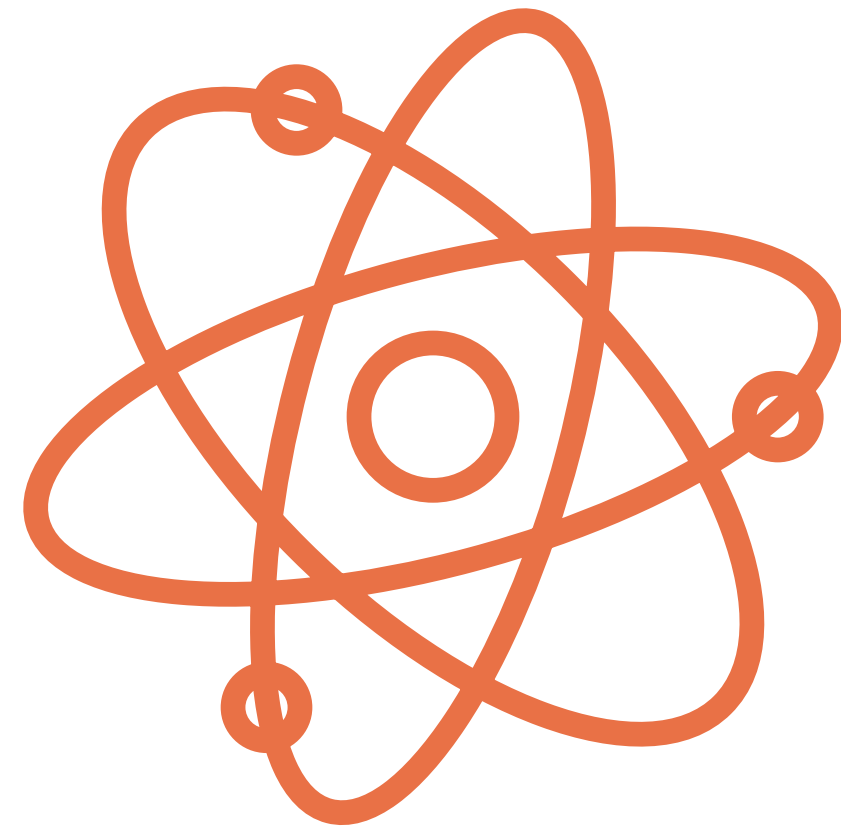
ADD ON ARTERIAL AGE IS ESSENTIAL

EVA : Early Vascular Aging

SUPERNOVA : Super Normal Vascular Aging

In conclusion, we demonstrated that individuals whose vascular age is lower than their chronological age (the SUPERNOVA phenotype) showed an age- and sex-adjusted rate of cardiovascular events about 40% lower than individuals with normal VA, despite a greater chronological age and a substantially similar burden of cardiovascular risk factors. Furthermore, the use of EVA classification may help identifying individuals at premature risk of coronary events for nonconventional cardiovascular risk factors, particularly women. In the future, dissecting the environmental and genetic mechanisms explaining the SUPERNOVA phenotype will help identify new therapeutic targets for successful vascular aging and target those environmental factors beyond classical cardiovascular risk factors which may favor it. However, the correct identification of EVA is crucial to set up public health strategies for prevention and ameliorate prognosis of individuals showing accelerated vascular aging not captured by standard assessment of risk.

SCIENTIFIC BOARD



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QUOTES FROM HCPs USING THE POPMETRE®

DR J

Dr J - GP

« I use pOpmetre a lot. This allows me to present this cardiovascular consultation to the patient in a different way. I look at cardiovascular risk in a more global way and I better identify my patients most at risk, whom I take care of in a more personalized way by using arterial age to initiate behavioral changes.»

Pr B

Pr B - Cardiologist

« I use pOpmetre a lot. This allows me to present this cardiovascular consultation to the patient in a different way. I look at cardiovascular risk in a more global way and I better identify my patients most at risk, whom I take care of in a more personalized way by using arterial age to initiate behavioral changes.»

Dr H

Dr H - nephrologist

« For a patient with kidney failure, high PWV values revealed by the pOpmeter may indicate deterioration in the elasticity of the arteries, often due to calcium buildup and other factors related to chronic kidney disease. This information is crucial, because it allows us to intervene earlier with targeted therapeutic strategies, aimed at reducing cardiovascular risk.»

Dr F

Dr F - GP - somnologist

«Sleep disorders can have a significant impact on cardiovascular health. In our practice, we have incorporated the use of the pOpmeter to assess pulse wave velocity (PWV) in patients with sleep disorders, such as I sleep apnea. This tool allows us to complete our clinical evaluation by identifying patients who, in addition to their sleep disorders, may be at risk of cardiovascular complications. As a result, we can adapt our care, not only by treating sleep disorders but also by taking preventive measures for cardiovascular health. Integrating the pOpmeter into the assessment of our patients strengthens our holistic approach, helping us improve their overall quality of life.»

RECOMMENDATIONS

FROM HCPS USING THE POPMETRE®



Pr Asmar
Cardiologist

“In my opinion, the main advantage of the pOpmètre® is that it is not operator- dependent. You put the pOpmètre® on and let it work, unlike other devices on the market.”



Pr Addad
Cardiologist

“In one year, I took over 1,500 measurements and observed a significant improvement in the arterial age of the 100 patients treated, thanks to the adaptation of the treatment.”



Dr Guicheteau
General Practitioner

“The pOpmètre® makes it possible to carry out an absolutely painless examination, which is therefore easily accepted by patients. It's a technical procedure that can be integrated into the patient's care and for which it's possible to delegate tasks.”



PARTNERS
THEY TRUST US



THANK YOU

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