

Specific conditions allowing for recreational scuba diving in subject with coronary artery disease : Recommendations for French underwater federation.

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Scuba diving is usually contraindicated in subjects with coronary heart disease because of the undue strain it asserts on the cardiovascular system. However, a more flexible approach may be considered when assessing **highly motivated individuals**. These recommendations have been established according to :

- ESC/SFC guidelines for care of coronary artery disease,
- Recommendations for participation in leisure-time physical activity and competitive sports for patients with ischaemic heart disease. (Eur J of Cardiovascular Prevention and Rehabilitation, 2006, 13 (2) : 137-149).
- 36th Bethesda conference : Eligibility recommendations for competitive athletes with cardiovascular abnormalities (J Am Coll Cardiol, 2005, vol 45 (8) : 1313-1375).
- Usual recommendations of diving medicine, hyperbaric medicine and aerospace medicine.



"Patients with multiple vessel disease as well as those with left main stenosis are at higher risk of serious cardiac event"
ESC. Management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. Eur Heart J. 2002, 23 : p.1817.



"Lors des efforts soutenus ou intenses, les contraintes mécaniques pulmonaires sont donc sensiblement plus grandes en immersion (...). De nombreux facteurs concourent donc à faciliter l'œdème pulmonaire en immersion."
Physiologie et médecine de la plongée (2^e éd), Ellipses (Paris), 2006 : p.131.

"Lower-risk group (all below)

- Normal exercise capacity on testing, for age and sex, as well as for type of intended activity;
- absence of exercise-induced ischaemia during stress testing;
- ejection fraction >50% on echocardiography at rest..."

Eur J of Cardiovascular Prevention and Rehabilitation, 2006, 13 (2) : p.142.



"The energy cost of swimming with SCUBA for women was significantly less than that for men"
Pendergast DR, Tolosco M, Nawrocki DM, Fischer NM. Energetics of underwater swimming with SCUBA. Med Sci Sport Exerc, 1996, 28 (5) : 873-880.



"...aucune inadéquation entre débit coronaire et travail myocardique en hyperoxie hyperbare."
Wattel F, Mathieu D et coll. Traité de médecine hyperbare, Ellipse (Paris), 2002 : p.73.

Patient with coronary heart disease
wishing to take up recreational scuba diving
with his cardiologist's approval.

Minimal 6 months symptom free delay
(no recent history of recurrent chest pain, dyspnea or malaise)
following last coronary event
(acute episode or revascularization),
no need for nitrate medication and
regular cardiologic follow up.

- **No diffuse tri-vessel or left main coronary arteriosclerosis** (even after revascularization).
- **No documented coronary spasm.**
- **Preserved left ventricular heart function (LEVF > 50 % documented** with test result realized after last coronary event but less than one year).

Treatment in accordance with
current preventive therapeutic guidelines
(including beta blockers when indicated
but excluding hypoglycaemic drugs).
Optimal control of potential risk factor,
in accordance with current guidelines,
in particular a definitive end of tobacco use.

Arrhythmia and ischemic free cardiac stress result,
(under beta blockers when indicated)
evidencing sustained and regular physical exercise with
above average physical capacity
according for age and gender and in all cases :
≥10 METs for a less than 50 year old male,
≥ 8 METs for a male over 50
or a less than 50 year old female,
≥ 6 METs for a female over 50.

If these conditions are met, a medical non contraindication certificat
for recreational suba diving
can be delivered by a bonafide federal physician.
Monitoring of other divers and use of hypoxic mixed gas are prohibited.
Eventual instructional diving should be limited to 6 meters (20 feet)
except for first scuba experience.
Annual renewal is possible as long as a yearly stress EKG
is performed with a regular cardiologic follow-up.

Exceptions to these specific conditions should be addressed
by the corresponding regional medical commission.

"Les délais de la reprise du travail sont variables
(...) de quelques semaines à 6 mois"

Recommandations de la SFC concernant la prise en charge de l'infarctus du myocarde après la phase aiguë. Arch Mal Cœur Vaiss. 2001, tome 94 (7) : p.724.



"Cold pressor test (...) for the detection of coronary spasm"
European Society of Cardiology. Guidelines on the management of stable angina pectoris. Eur Heart J. 2006, 27 : 1341-1374.



For "patients with high risk-factor profile and no signs of ischaemia (...) restrictions may apply for extreme sports, for example scuba diving"

Eur J of Cardiovascular Prevention and Rehabilitation, 2006, 13 (2) : p.146.



"Midly increased risk (...):

- 1 Preserved LV systolic function at rest (EF > 50%)
- 2 Normal exercise tolerance for age demonstrated during ergometer exercise testing :
greater than 10 METs if less than 50 years old ;
greater than 9 METs for 50 to 59 years old ;
greater than 8 METs if 60 to 69 years old and
greater than 7 METs if greater than or equal to 70 years old"

J Am Coll Cardiol, 2005, vol 45 (8) : p.1349.



"Patients (...) who wish to undertake sport diving need to be denied this activity, although commercial diving should not be approved. (...) If the diver (...) limited sport diving may be considered. Lesser capacity would require careful selection of non stressful diving."

Bove and Davis' Diving Medicine (4th ed), Saunders (Philadelphia), 2004 : p.504.