



## Long-term dry immersion: review and prospects

Submitted by Emmanuel Lemoine on Tue, 02/24/2015 - 15:44

Titre	Long-term dry immersion: review and prospects
Type de publication	Article de revue
Auteur	Navasiolava, Nastassia [1], Custaud, Marc-Antoine [2], Tomilovskaya, E. S [3], Larina, I. M [4], Mano, T. [5], Gauquelin-Koch, G. [6], Gharib, C. [7], Kozlovskaya, I. B [8]
Editeur	Springer Verlag
Type	Article scientifique dans une revue à comité de lecture
Année	2011
Langue	Anglais
Date	2011
Numéro	7
Pagination	1235 - 60
Volume	111
Titre de la revue	European Journal of Applied Physiology
ISSN	1439-6327
Mots-clés	Bed Rest [9], Head-Down Tilt/physiology [10], History, 20th Century [11], History, 21st Century [12], Humans [13], Immersion/physiopathology [14], Models, Biological [15], Space Flight [16], Weightlessness [17], Weightlessness Simulation/history/methods/trends [18]
Résumé en anglais	<p>Dry immersion, which is a ground-based model of prolonged conditions of microgravity, is widely used in Russia but is less well known elsewhere. Dry immersion involves immersing the subject in thermoneutral water covered with an elastic waterproof fabric. As a result, the immersed subject, who is freely suspended in the water mass, remains dry. For a relatively short duration, the model can faithfully reproduce most physiological effects of actual microgravity, including centralization of body fluids, support unloading, and hypokinesia. Unlike bed rest, dry immersion provides a unique opportunity to study the physiological effects of the lack of a supporting structure for the body (a phenomenon we call 'supportlessness'). In this review, we attempt to provide a detailed description of dry immersion. The main sections of the paper discuss the changes induced by long-term dry immersion in the neuromuscular and sensorimotor systems, fluid-electrolyte regulation, the cardiovascular system, metabolism, blood and immunity, respiration, and thermoregulation. The long-term effects of dry immersion are compared with those of bed rest and actual space flight. The actual and potential uses of dry immersion are discussed in the context of fundamental studies and applications for medical support during space flight and terrestrial health care.</p>
URL de la notice	<a href="http://okina.univ-angers.fr/publications/ua8308">http://okina.univ-angers.fr/publications/ua8308</a> [19]
DOI	10.1007/s00421-010-1750-x [20]
Lien vers le document	<a href="http://dx.doi.org/10.1007/s00421-010-1750-x">http://dx.doi.org/10.1007/s00421-010-1750-x</a> [20]

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- [20] <http://dx.doi.org/10.1007/s00421-010-1750-x>

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