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Title: Voice fundamental frequency levels of divers in helium-oxygen speaking environments

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Abstract: Divers under hyperbaric conditions experience a marked deterioration in speech intelligibility. Included among the possible features that contribute to speech degradation is change/distrotion of speaking fundamental frequency (SFF). Based on the physics of the environment and the physiology of the diver, it would not be expected that SFF would change as a function of varying helium-oxygen pressure conditions. However, in an earlier pilot study, a rise in SFF was found with increases in depth. To test this hypothesis, and to expand the previous limited findings, a large number of U. S. Navy divers were studied. The diver/subjects produced speech samples at the surface and at depths of 200, 450, and 600 fsw in helium-rich environments. The resulting data revealed increases in fundamental frequency to the 450-fsw depth and a subsequent decrease at 600 fsw; further analysis, however, based on data transforms, showed a more linear increase in SFF. From other observations, it was judged that behavioral rather than physical conditions were the primary cause of these SFF shifts; specifically, they appear to have resulted from divers' attempts to speak more intelligibly.

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