Session : Bone Mineral Content Change in Apollo Astronauts - Expressed as Precent of Mean Baseline

Experiment ID(s):	AP011	AP011	AP011			
Mission ID(s):	Apollo 14	Apollo 15	Apollo 16			

Payload ID	Scheduled Day	Actual Day	Actual Date	Subjects
Apollo 14		L-26	5 Jan 1971	3 subjects
Apollo 14		L-15	16 Jan 1971	3 subjects
Apollo 14		L-6	25 Jan 1971	3 subjects
Apollo 14		R+0	9 Feb 1971	1 subject *
Apollo 14		R+1	10 Feb 1971	3 subjects * ** ***
Apollo 14		R+6	15 Feb 1971	3 subjects
Apollo 14		R+16	25 Feb 1971	3 subjects
Apollo 15		L-27	29 Jun 1971	3 subjects
Apollo 15		L-13	13 Jul 1971	3 subjects
Apollo 15		L-5	21 Jul 1971	3 subjects
Apollo 15		R+0	7 Aug 1971	3 subjects
Apollo 15		R+1	8 Aug 1971	3 subjects
Apollo 15		R+5	12 Aug 1971	3 subjects
Apollo 15		R+14	21 Aug 1971	2 subjects
Apollo 16		L-30	17 Mar 1972	3 subjects
Apollo 16		L-15	1 Apr 1972	3 subjects
Apollo 16		L-5	11 Apr 1972	3 subjects
Apollo 16		R+0	27 Apr 1972	3 subjects
Apollo 16		R+1	28 Apr 1972	3 subjects
Apollo 16		R+3	29 Apr 1972	3 subjects
Apollo 16		R+7	4 May 1972	1 subject

Hardware Used

Parameters Measured

Session Constraints

The entire system was calibrated before and after each subject scan by measuring a Witt-Cameron standard which consisted of three chambers containing dipotassium hydrogen phosphate to simulate bone attenuation and a hydroxyapatite step wedge.

Protocol

Bone mineral content was determined in the central left os calcis and the right distal radius and ulna using the photon absorptiometric technique. The technique employed an essentially monoenergetic photon source, the 27.5 KeV X-ray of Iodine-125, and a sodium iodide crystal scintillation detector. These essential elements were mounted on a scanner yoke in direct apposition to each other and collimated so that a 3-millimeter beam was similarly viewed by a 3-millimeter entrance collimator

rectilinear raster pattern. The limb to be scanned was placed in tissue equivalent material to compensate for the irregular thickness of tissue cover that surrounds the bone. The foot was placed in a Plexiglas box filled with water, and the arm was encased in Superstuff when placed on a platform between uprights.

The most distal 2-centimeter portion of the radius and ulna were measured and reported as mean mineral content in grams of ash per centimeter of bone length. The mineral content of the central 2.5-centimeter section of the os calcis was reported in mg/cm2 of hydroxyapatite.

* at least one subject measured for os calcis bone mineral content only
** at least one subject measured for radius and ulna bone mineral content only
*** at least one subject measured for radius bone mineral content only
**** at least one subject measured for ulna and os calcis bone mineral content only

SESSION NAME:

Bone Scans Using Photon Absorptiometry Technique

Experiment ID(s):	AP011				

PROTOCOL

Bone mineral content was determined in the central left os calcis and the right distal radius and ulna using the photon absorptiometric technique. The technique employed an essentially monoenergetic photon source, the 27.5 KeV X-ray of iodine-125, and a sodium iodide crystal scintillation detector. These essential elements were mounted on a scanner yoke in direct apposition to each other and collimated so that a 3-millimeter beam was similarly viewed by a 3-millimeter entrance collimator on the detector. The yoke was mounted on a scanner which was able to scan a limb placed between the source and detector in a rectilinear raster pattern. The limb to be scanned was placed in tissue equivalent material to compensate for the irregular thickness of tissue cover that surrounds the bone. The foot was placed in a Plexiglas box filled with water, and the arm was encased in Superstuff when placed on a platform between uprights.<END>

Session Constraints

The entire system was calibrated before and after each subject scan by measuring a Witt-Cameron standard (consisting of three chambers containing dipotassium hydrogen phosphate to simulate bone attenuation) and a hydroxyapatite step wedge.<END>

Parameters Measured

Bone mineral content : os calcis
Bone mineral content : radius
Bone mineral content : ulna

Hardware Used

Rectilinear Bone Mineral Scanner
X-ray

DATA COLLECTION TIMETABLE

Payload ID	Scheduled Day	Actual Day	Actual Date	Grouped Subjects	Actual Subjects
Apollo 14		L-27 - L-26	4-5 JAN 1971	6 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		L-16 - L-15	15-16 JAN 1971	6 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		L-7 - L-6	24-25 JAN 1971	6 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		ground control corresponding to	1-3 FEB 1971	2 subjects	Apollo 14 control subject 1
Apollo 14		ground control corresponding to	7 FEB 1971	1 subject	Apollo 14 control subject 1
Apollo 14		R+0 - R+1	9-10 FEB 1971	3 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		R+6	15 FEB 1971	4 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		R+9	18 FEB 1971	1 subject	Apollo 14 control subject 3
Apollo 14		R+16	25 FEB 1971	4 subjects	Apollo 14 commander Apollo 14 command
Apollo 14		R+18	27 FEB 1971	2 subjects	Apollo 14 control subject 2
Apollo 15		L-29	27 JUN 1971	2 subjects	Apollo 15 control subject 2
Apollo 15		L-27	29 JUN 1971	4 subjects	Apollo 15 commander Apollo 15 command
Apollo 15		L-14 - L-13	11-13 JUL 1971	6 subjects	Apollo 15 commander Apollo 15 command
Apollo 15		L-7 - L-5	19-21 JUL 1971	6 subjects	Apollo 15 commander Apollo 15 command
Apollo 15		ground control corresponding to	5 AUG 1971	3 subjects	Apollo 15 control subject 1
Apollo 15		R+0 - R+1	7-9 AUG 1971	6 subjects	Apollo 15 commander Apollo 15 command
Apollo 15		R+5	12 AUG 1971	6 subjects	Apollo 15 commander Apollo 15 command
Apollo 15		R+12 - R+14	19-21 AUG 1971	4 subjects	Apollo 15 commander Apollo 15 command
Apollo 16		L-32	15 MAR 1972	4 subjects	Apollo 16 control subject 1
Apollo 16		L-30	17 MAR 1972	3 subjects	Apollo 16 commander Apollo 16 command
Apollo 16		L-17	30 MAR 1972	4 subjects	Apollo 16 control subject 1
Apollo 16		L-15	1 APR 1972	3 subjects	Apollo 16 commander Apollo 16 command
Apollo 16		L-7	9 APR 1972	2 subjects	Apollo 16 control subject 2
Apollo 16		L-5	11 APR 1972	7 subjects	Apollo 16 commander Apollo 16 command
Apollo 16		ground control corresponding to	25-26 APR 1972	4 subjects	Apollo 16 control subject 1
Apollo 16		R+0 - R+1	27-28 APR 1972	3 subjects	Apollo 16 commander Apollo 16 command
Apollo 16		R+3	30 APR 1972	7 subjects	Apollo 16 commander Apollo 16 command
Apollo 16		R+7	4 MAY 1972	5 subjects	Apollo 16 command module pilot