

# On The Effect of Sports upon the Absorption of Calcium

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Experiments and theories on the absorption of calcium have been often presented since Aristowsky and Bergeim.<sup>(1)</sup> Recently Mori,<sup>(2)</sup> Kuroda,<sup>(3)</sup> and Shimizu also<sup>(4)</sup> reported on it in our country and now experiments and theories are too many to enumerate.<sup>(5)</sup>

These studies, however, are chiefly based on a medical standpoint. Studies based on a physical culture are rare and, so far as known, only Hara is there.

The author,<sup>(7)(8)</sup> in the previous work, examined the calcium metabolism of the student sportsmen, about twenty years of age and almost grown-up, in the previous summer, and observed that the absorption of calcium was better in sports times than in ordinary times.

This time, the author made the further study of it by the growing pupils and wishes to report it.

## Material and Methods

### 1. Examinees and date of experiments

As examinees eight pupils, about ten years of age, were chosen.

The experiments were made for a week, from the 10th to the 16th of August, '65.

### 2. Supply of foods

During the days of experiments examinees were, according to the plan of menu, supplied, at the same time, with such foods as were usually eaten by them. They were supplied with side-dishes and refreshments equally in quantity but principal foods were more or less free according to their appetites.

### 3. Collecting of material

The same side-dishes and refreshments as were eaten by examinees were collected at each meal. Principal foods were collected regularly in quantity at each meal. All excretions were collected every day from the third day to the eighth day.

### 4. Quantitative analysis of calcium

One helping of side dish was burnt to ashes at each meal and refreshments

were, whenever they were given. Then these ashes were analyzed for calcium using Microanalysis of A. O. A. C. Three kinds of the quantity of calcium, that of principal foods, that of side-dishes and that of refreshments, were added together and were taken the average in a week. Thus the quantity of calcium which a man took in a day was measured. calcium in excretions was measured from the third day to eighth day, and was taken the average per a day. Thus, comparing the quantity of calcium in foods with that in excretions, the quantity of the absorbed calcium and the percentage of the absorption of calcium were calculated.

## 5. Experiments

Eight examinees were divided into two parts, five pupils were sports group and three pupils were non-sports group.

Five pupils of sports group were forced to take, together with other non-examinees, exercises, such as ball throwing, ball kicking, simplified baseball, roller skate, and so on, for two hours in the morning and for two hours afternoon. They could do whatever they wanted in the rest of hours, while three pupils of non-sports group were forced not to take such an intense exercises, but to play the indoor games, such as cards playing, magazine reading, talking, etc. or a slight stroll.

## Results and Discussion

Absorption of calcium in two groups (sports group and non-sports group) is shown below. Table 1 Effect of sports upon the absorption of calcium.

mg / day

groups	age	sex	quantity of eaten calcium	quantity of calcium in excrete	quantity of absorbed calcium	percentage of the absorption of calcium
sports group	8	male	417	216	201	48.3 %
	9	"	364	169	135	53.5
	10	"	463	209	254	58.9
	10	"	504	281	223	44.2
	11	"	257	129	128	44.9
average	—	—	401.0	199.9	201.1	50.16
non-sports group	9	male	443	249	194	43.7
	10	"	473	263	210	44.4
	11	female	425	258	167	39.3
average	—	—	447.0	257.2	180.8	42.47

These were observed for a week.

According to these results, sports group's absorption of calcium is 118, if we suppose non-sports group's one is 100, and t-test of the student is as follows;  $t=2,669$ ,  $t_0=2,368$  (0.05)

These are nearly accord with my previous results<sup>7)8)</sup> that is, the absorption of calcium is better in sports times than in ordinary times.

In recent years, the importance of calcium has been noticed and many works on the quantity of taken calcium,<sup>9)10)11)</sup> the minimum quantity of necessary calcium,<sup>12)13)14)</sup> and absorption of calcium,<sup>15)16)17)</sup> have been reported. Now, how to absorb and to use calcium is the problem not only of the individual but of whole nation. And according to the results of these experiments, it may be said that moderate exercises are one of the solutions of this problem.

### Summary

1. The experiments on the absorption of calcium of pupils, about ten years of age, in sports times and in ordinary times, were made early in August in '65.
2. The percentage of the absorption of calcium in sports times was  
44.2~58.9% average; 50.16%  
the percentage of the absorption of calcium in ordinary times was  
39.3~44.4% average; 42.47%
3. According to these results, the absorption of calcium is better in sports times than in ordinary times and an error is five percent.

### References

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