

In a typical experiment, serum mixed with tissue fibrinogen (Merrel's Fibrogen) shows no (or occasionally just a trace of) activation. The following values were obtained: 2 drops serum, coagulation time $3\frac{1}{4}$ min.; 2 drops tissue fibrinogen, $3\frac{1}{4}$ min.; 1 drop of each, $3\frac{1}{4}$ min. The same serum, used in greater concentration to render it isocoagulant with fresh chick extract, shows marked activation; 2 drops serum, $2\frac{1}{4}$ min.; 2 drops chick extract, $2\frac{1}{4}$ min.; 1 drop of each, 45 sec.

Controls are run before and after the experiment to determine whether the coagulants remained isocoagulant during the test. Plasma is citrated to 0.5%; serum is from citrate plasma freshly clotted by recalcification; chick extract is made by extracting a 10 day chick embryo in 10 cc. Ringer fluid according to a method described earlier.³

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**Serum Calcium in Relation to Menstruation in Cases with
Dysmenorrhea.***

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A study of the serum calcium in relation to the menstrual cycle in a group of 10 women who had dysmenorrhea was made. The cases selected were those having severe dysmenorrhea necessitating bed rest every month. Our purpose was to determine whether women having dysmenorrhea showed any significant variations in calcium level from women with normal menstrual periods.

Serum calcium determinations were made in duplicate on 10 dysmenorrhea cases twice a week for 4 consecutive weeks. The blood was drawn between 8 and 10 a. m. The determinations of serum calcium were made by one of us (E. M. G.) using the Clark-Collip¹ modification of the Kramer-Tisdall² method. A total of 80 readings were made.

³ King, J. T., *Arch. f. Exp. Zellforsch.*, 1930, **9**, 341.

* This study was carried out with the aid of a grant from the Research Fund of the University of Minnesota.

¹ Clark, E. P., and Collip, J. B., *J. Biol. Chem.*, 1925, **63**, 461.

² Kramer, B., and Tisdall, F. F., *J. Biol. Chem.*, 1921, **47**, 475.

TABLE I.
Serum Calcium Variations in a Group of 10 Cases of Dysmenorrhea. Bi-weekly Determinations for 4 Weeks.

Case No.	Age	Low	High	Mean	P. E. of Mean	S. D.
1	18	10.50	11.35	10.81	$\pm .07$	.29
2	21	9.82	10.75	10.34	$\pm .08$	.33
3	23	10.29	10.93	10.54	$\pm .05$	.20
4	22	10.52	10.73	10.64	$\pm .02$	.07
5	21	10.33	10.62	10.49	$\pm .02$	.10
6	22	10.38	11.08	10.73	$\pm .06$	.27
7	19	10.56	10.97	10.78	$\pm .04$	.14
8	20	10.56	11.05	10.76	$\pm .05$	.20
9	22	9.59	11.06	10.09	$\pm .11$	.45
10	30	9.73	11.52	10.53	$\pm .13$	.51
Means	21.80	10.23	11.01	10.57		
Range .78						

Table I presents the range in the serum calcium and the mean of the 8 determinations for each individual in the group.

The mean low reading for the group was 10.23 mg., the mean high reading 11.01 mg., giving a mean range of 0.78 mg. In a group of women with normal menstrual periods studied by us,³ the range was 1.15 mg. This difference in range, however, is not sufficient to be of significance.

The mean reading for the entire group was 10.57 mg. In our group of normal women we found a mean of 10.01 mg., again a difference of no significance.

TABLE II.
Serum Calcium Level in Relation to Menstrual Cycle, 10 Cases of Dysmenorrhea.

	Mean mg. Calcium	P. E. of Mean	S. D.	Difference of Means
Rest	10.49	$\pm .05$	.3042	
Pre-menstrual	10.57	$\pm .04$	.2769	.08 $\pm$.06
Menstrual	10.61	$\pm .05$	.3319	.04 $\pm$.07
Post-menstrual	10.61	$\pm .06$	.4277	.00 $\pm$.08
				.12 $\pm$.08

Table II presents the mean serum calcium for each week of the menstrual cycle. The lowest reading of 10.49 mg. occurs in the rest period, while in the normal group, the lowest reading occurred in the menstrual week. The apparent cyclic variation in calcium levels in relation to menstruation found in the women with normal menses, with a pre-menstrual rise and post-menstrual fall in serum calcium was not observed in this group with dysmenorrhea. No

³ Boynton, Ruth E., and Greisheimer, Esther M., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **28**, 907.

significant differences between the mean reading for each week of the menstrual cycle was found.

All of the cases of dysmenorrhea in this group had previously been treated by the oral administration of calcium gluconate. Cases 1 to 6 inclusive had complete relief with calcium therapy while cases 7 to 10 had no relief. In Table III the mean calcium readings in relation to the menstrual cycle for the group of cases relieved by calcium therapy and for the group without benefit are presented. No significant differences are found in the 2 groups at any period in the cycle. It is evident that no basis for predicting response to calcium therapy can be obtained by serum calcium determinations.

TABLE III.
Serum Calcium Level in Relation to Menstrual Cycle.
A—6 Dysmenorrhea Cases Relieved by Calcium Therapy.
B—4 Dysmenorrhea Cases not Relieved by Calcium Therapy.

	A			B		
	Mean	P. E.	S. D.	Mean	P. E.	S. D.
Rest	10.56	$\pm .05$	.27	10.38	$\pm .11$	.45
Pre-menstrual	10.60	$\pm .05$	.27	10.52	$\pm .08$	.29
Menstrual	10.58	$\pm .03$	.12	10.64	$\pm .11$	.48
Post-menstrual	10.62	$\pm .07$	.36	10.59	$\pm .12$	.50

Summary. From a study of the serum calcium of 10 cases of dysmenorrhea biweekly for 4 weeks, it is found: 1. The mean range of serum calcium, while lower than that found in a group of women with normal menstrual periods, was not significantly lower. 2. The lowest mean serum calcium occurred in the rest period of the menstrual cycle. 3. In women with dysmenorrhea there appears to be no cyclic variation in calcium level in relation to the menses. 4. There seems to be no significant difference in serum calcium levels in cases of dysmenorrhea responding to calcium therapy and in those not benefited by such therapy.