International Journal of Multidisciplinary Innovation and Research Methodology (IJMIRM)
Volume 1, Issue 1, October-December, 2022, Available online at: https://ijmirm.com

Numerous Risk Factors Regarding Vitamin D and Stress Fractures in Sports

Dr. Chung Li

Professor, Department of Dentistry, Lingnan University, Hong Kong

ABSTRACT

According to the research that's been done, there are a lot of different things that can put you at risk for getting a stress fracture. In sports, stress fractures can be caused by a combination of circumstances, one of which is a prolonged risk of vitamin D deficiency. Stress fractures are a common injury that can impact any athlete, from the weekend warrior to the professional. Certain sporting activities, such as basketball, baseball, athletics, rowing, soccer, aerobics, and classic ballet, have a high incidence of stress fractures. The primary objective of this investigation is to evaluate existing understanding concerning vitamin K. In the field of undergraduate dentistry education, VD and stress fractures are commonplace. Methodology: Using a web-based tool called Google forms, a cross-sectional study was carried out among undergraduate dentistry students (I,II,III,IV and Interns) in a tertiary care teaching hospital in Tuen Mun. A semi-structural online questionnaire was designed and sent to the students in order for them to fill it out. The results of the study were analysed using descriptive statistics. The IBM SPSS statistics programme version 29.0.0.0 was utilised in order to compile the descriptive statistics and conduct the chi-square test. To determine whether or not there was statistical significance, an AP-value of less than 0.05 was employed. The findings showed that a total of 204 students participated, with females comprising 72.1% of the group and boys accounting for 27.9%. The participants' ages range anywhere from 18 to 35 years old. According to the findings of this research, female students have a greater awareness than male students do regarding Vitamin D and stress fractures in sports. Interns have more expertise and awareness than IV BDS technicians, who are followed by III BDS technicians. The findings of the study point to the conclusion that students have a knowledge level that is pretty adequate about vitamin D and stress fractures.

Keywords: Microfractures, Vitamin D, and Stress Fractures.

INTRODUCTION

In addition to occurring as insufficiency fractures as a result of secondary osteoporosis, stress fractures are caused when the bone is subjected to an excessive amount of stress as a result of continuous and repetitive loading. The site of stress fractures might vary from sport to sport, however the tibia is the most prevalent place for them to occur in the lower limbs. It has been hypothesised that vitamin D plays a significant part in the formation of stress fractures. A lack of vitamin D can increase the risk of stress fractures by lowering bone density. It can also affect muscular function and coordination, as well as raise the levels of inflammation and oxidative stress. Stress fractures are characterised by a variety of symptoms, including discomfort, edoema, and difficulties bearing weight. Athletes can prevent vitamin D insufficiency and reduce the risk factors that put them at risk by obtaining sufficient sun exposure or taking vitamin D supplements, by having a nutritious diet, and by exercising on a regular basis. Athletes can treat stress fractures in a number of ways, including resting the affected limb and avoiding high-impact activities; making use of supportive devices, such as braces; or participating in a rehabilitation programme developed by medical professionals.

The purpose of this study is to evaluate the levels of knowledge held by undergraduate dental students on Vitamin D and stress fractures.

1. To find out how much undergraduate dentistry students know about vitamin D and stress fractures, and to see if there are any gender differences in that knowledge.

2. To establish whether or not undergraduate students, based on their year of study, are aware of the relationship between vitamin D deficiency and stress fractures.

METHODOLOGY

a) The Type of Research Conducted The research consisted of a cross sectional analysis.
b) The Location of the Study: A Tertiary Care Teaching Hospital.
c) The study population consisted of dental students who answered to an online questionnaire that was distributed via social media. This population included students in their first, second, third, and fourth years as well as interns.
d) The research instrument consisted of a self-administered questionnaire that was developed based on previous experience. The online Google form link was used to disseminate the questionnaire, which contained a total of 15 questions. The demographic information of each participant, including their name, age, gender, and year of study, must be filled out. The participant is required to choose one answer from the options that have been offered in response to the questions. The questions were designed to assess the level of knowledge and awareness athletes have regarding vitamin D and stress fractures.
e) Pilot Study: In order to evaluate the validity and reliability of the questionnaire, a small group of students participated in a study that served as a pilot.
f) Sampling Equipment: the method of sampling that was utilised was called convenience sampling.

Students who were interested in the study and were willing to participate are considered for inclusion according to the inclusion criteria (G).

Students who were not willing to fill out the questionnaire were not considered for inclusion in the study (H) Exclusion Criteria.

a) Organising the Study After having the goal of the study briefly outlined in a letter that was shared on social media alongside a link to the study, participants were given the opportunity to respond to a series of questions by selecting one answer from a list of possible responses.
b) Statistical analysis: the data obtained from the filled-out questionnaire were entered into a tabular form in an excel worksheet and then evaluated for statistical significance. SPSS version was utilised in order to carry out the analysis.
c) Approval from the institution's ethical committee was necessary in order to receive ethical clearance, which was eventually received.
d) Consent after informed discussion: prior to the beginning of the study, a consent after discussion was obtained.

RESULTS

A total of 204 students responded to the survey. The bulk of the students who responded were female (72.1%), while just 27.9% of respondents were male. The following is a breakdown of the student population according to their year of enrolment:

1 BDS (1.5), 2BDS(20.1), 3BDS(12.3), 4BDS(18.6), Interns(47.5).

DISCUSSION

In order to determine the students' overall levels of knowledge, this study concentrated mostly on those enrolled in college. The purpose of this research was to discover and compare existing knowledge regarding vitamin D and stress fractures. Regarding athletics among adults aged 18 to 38.

Demographic Summary:

AGE

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	204	18	38	22.33	2.212
Valid N (list wise)	204				

Gender

		Frequency	Percent
Valid	MALE	57	27.9
	FEMALE	147	72.1
	Total	204	100.0

Year of Study

		Frequency	Percent
Valid	I BDS	3	1.5
	II BDS	41	20.1
	III BDS	25	12.3
	IV BDS	38	18.6
	INTERN	97	47.5
	Total	204	100.0

Distribution and comparison of responses based on gender:

Item	Response	Males		Females		Chi-Square value	P value	Total	
		n	%	n	%			n	%
Q1	1	8	34.8	15	65.2	5.859	0.119	23	11.3
	2	9	50	9	50			18	8.8
	3	4	26.7	11	73.3			15	7.4
	4	36	24.3	112	75.7			148	72.2
Q2	1	9	32.1	19	67.9	1.647	0.800	28	13.7
	2	4	30.8	9	69.2			13	6.4
	3	13	30.2	30	69.8			43	21.1
	4	22	23.7	71	71			93	45..6
	5	9	33.3	18	66.7			27	13.2
Q3	1	29	27.9	75	72.1	0.81	0.994	104	51
	2	7	25.9	20	74.1			27	13.2
	3	10	28.6	25	71.4			35	17.2
	4	11	28.9	27	71.1			38	18.6
Q4	1	13	37.1	22	62.9	2.048	0.562	35	17.2
	2	11	26.2	31	73.8			42	20.6
	3	10	29.4	24	70.6			34	16.7
	4	23	24.7	70	75.3			93	45.6
Q5	1	15	19.7	61	80.3	10.500	**0.015***	76	37.3
	2	9	60	6	40			15	7.4
	3	28	30.1	65	69.9			93	45.6
	4	5	25	15	75			20	9.8
Q6	1	8	38.1	13	61.9	7.219	0.065	21	10.3
	2	10	50	10	50			20	9.8
	3	3	23.1	10	76.9			13	6.4
	4	36	24	114	76			150	73.5
Q7	1	7	38.9	11	61.1	11.799	0.08	18	8.8
	2	12	52.2	11	47.8			23	11.3
	3	6	40	9	60			15	7.4
	4	32	21.6	116	78.4			148	72.5
Q8	1	8	42.1	11	57.9	7.598	**0.054***	19	9.3
	2	9	45	11	55			20	9.8

	3	7	36.8	12	63.2			19	9.3
	4	33	22.6	113	77.4			146	71.6
Q9	1	9	40.9	13	59.1	7.974	**0.047***	22	10.8
	2	8	47.1	9	52.9			17	8.3
	3	4	44.4	5	55.6			9	4.4
	4	36	27.9	130	76.9			156	76.5
Q10	1	10	43.5	13	56.5	11.349	**0.010***	23	11.3
	2	11	52.4	10	47.6			21	10.3
	3	3	21.4	11	78.6			14	6.9
	4	33	22.6	113	77.4			146	71.6
Q11	1	10	38.5	16	61.5	1.832	0.608	26	12.7
	2	5	25	15	75			20	9.8
	3	32	25.8	92	74.2			124	60.8
	4	10	29.4	24	70.6			34	16.7
Q12	1	11	40.7	16	59.3	3.930	0.269	27	13.2
	2	6	35.5	11	64.7			17	8.3
	3	7	31.8	15	68.2			22	10.8
	4	33	23.9	105	76.1			138	67.6
Q13	1	7	30.4	16	69.6	1.289	0.732	23	11.3
	2	8	29.6	19	70.4			27	13.2
	3	17	32.7	35	67.3			52	25.5
	4	25	24.5	77	75.5			102	50
Q14	1	10	24.4	31	75.6	3.044	0.385	41	20.1
	2	11	40.7	16	59.3			27	13.2
	3	9	22.5	31	77.5			40	19.6
	4	27	28.1	147	71.9			96	47.1
Q15	1	15	46.9	17	53.1	6.880	0.76	32	15.7
	2	5	21.7	18				23	11.3
	3	4	26.7	11				15	7.4
	4	33	24.6	101				134	65.7

P≤0.05 is statistically significant

Distribution and comparison of responses based on year of the study:

Item	Response	I BDS		II BDS		III BDS		IV BDS		INTERN		Chi-Value	P-Value	Total	
		n	%	n	%	n	%	n	%	n	%			N	%
Q1	1	0	0	5	21.7	0	0	2	8.7	16	69.6	15.352	0.223	23	11.3
	2	0	0	5	27.8	1	5.6	5	27.8	7	38.9			18	8.8
	3	0	0	2	13.3	0	0	4	26.7	9	60			15	7.4
	4	3	2	29	19.6	24	16.2	27	18.2	65	43.9			148	72.5
Q2	1	0	0	4	14.3	2	7.1	5	17.9	17	60.7	28.430	**0.028***	28	13.7
	2	0	0	2	15.4	0	0	6	46.2	5	38.5			13	6.4
	3	0	0	16	37.2	4	9.3	7	16.3	16	37.2			43	21.1
	4	3	3.2	14	15.1	18	19.4	14	15.1	44	47.3			93	45.6
	5	0	0	5	18.5	1	3.7	6	22.2	15	55.6			27	13.2
Q3	1	3	2.9	16	15.4	16	15.4	14	13.5	55	52.9	22.944	**0.028***	104	51
	2	0	0	8	29.6	4	14.8	9	33.3	6	22.2			27	13.2
	3	0	0	12	34.3	1	2.9	7	20	15	42.9			35	17.2
	4	0	0	5	13.2	4	10.5	8	21.1	21	55.3			38	18.6
Q4	1	0	0	12	34.3	3	8.6	4	11.4	16	45.7	17.474	0.133	35	17.2
	2	0	0	12	28.6	3	7.1	9	21.4	18	42.9			42	20.6
	3	1	2.9	5	14.7	2	5.9	6	17.6	20	58.8			34	16.7
	4	2	2.2	12	12.9	17	18.3	19	20.4	43	46.2			93	45.6

Q5	1	1	1.3	24	31.6	6	7.9	10	13.2	35	46.1	17.352	0.137	76	37.3
	2	0	0	4	26.7	1	6.7	3	20	7	46.7			15	7.4
	3	2	2.2	12	2.9	16	17.2	19	20.4	44	47.3			93	45.6
	4	0	0	1	5	2	10	6	30	11	55			20	9.8
Q6	1	0	0	4	19	0	0	3	14.3	14	66.7	14.589	0.265	21	10.3
	2	0	0	5	25	0	0	7	35	8	40			20	9.8
	3	0	0	1	7..7	2	15.4	2	15.4	8	61.5			13	6.4
	4	3	2	31	20.7	23	15.3	26	17.3	67	44.7			150	73.5
Q7	1	0	0	5	27.8	1	5.6	2	11.1	10	55.6	9.234	0.683	18	8.8
	2	0	0	5	21.7	1	4.3	7	30.4	10	43.5			23	11.3
	3	0	0	2	13.3	1	6.7	2	13.3	10	66.7			15	7.4
	4	3	2	29	19.6	22	14.9	27	18.2	67	45.3			148	72.5
Q8	1	0	0	7	36.8	0	0	3	15.8	9	47.4	11.801	0.462	19	9.3
	2	0	0	4	20	1	5	6	30	9	45			20	9.8
	3	0	0	3	15.8	1	5.3	4	21.1	11	57.9			19	9.3
	4	3	2.1	27	18.5	23	15.8	25	17.1	68	46.6			146	71.6
Q9	1	0	0	4	18.2	0	0	5	22.7	13	59.1	9.958	0.620	22	10.8
	2	0	0	4	23.5	1	5.9	5	29.4	7	41.2			17	8.3
	3	0	0	3	33.3	0	0	2	22.2	4	44.4			9	4.4
	4	3	1.9	30	19.2	24	15.4	26	16.7	73	46.8			156	76.5
Q10	1	0	0	2	8.7	0	0	5	21.7	16	69.6	14.840	0.250	23	11.3
	2	0	0	6	28.6	1	4.8	3	14.3	11	52.4			21	10.3
	3	0	0	3	21.4	1	7.1	5	35.7	5	35.7			14	6.9
	4	3	2.1	30	20.5	23	15.8	25	17.1	65	44.5			146	71.6
Q11	1	0	0	5	19.2	0	0	5	19.2	16	61.5	19.134	0.085	26	12.7
	2	0	0	9	45	2	10	4	20	5	25			20	9.8
	3	3	2.4	20	16.1	20	16.1	20	16.1	61	49.2			124	60.8
	4	0	0	7	20.6	3	8.8	9	26.5	15	44.1			34	16.7
Q12	1	0	0	2	7.4	0	0	7	25.9	18	66.7	21.968	**0.038***	27	13.2
	2	0	0	8	47.1	0	0	3	17.6	6	35.3			17	8.3
	3	0	0	3	13.6	3	13.6	3	13.6	13	59.1			22	10.8
	4	3	2.2	28	20.3	22	15.9	25	18.1	60	43.5			138	67.6
Q13	1	0	0	3	13	0	0	2	8.7	18	78.3	37.961	**0.001***	23	11.3
	2	1	3.7	9	33.3	1	3.7	9	33.3	7	25.9			27	13.2
	3	0	0	8	15.4	2	3.8	8	15.4	34	65.4			52	25.5
	4	2	2	21	20.6	22	21.6	19	18.6	38	37.3			102	50
Q14	1	1	2.4	10	24.4	3	7.3	4	9.8	23	56.1	15.604	0.210	41	20.1
	2	0	0	5	18.5	0	0	6	22.2	16	59.3			27	13.2
	3	0	0	6	15	4	10	9	22.5	21	52.5			40	19.6
	4	2	2.1	20	20.8	18	18.8	19	19.8	37	38.5			96	47.1
Q15	1	0	0	5	15.6	0	0	6	18.8	21	65.6	15.123	0.235	32	15.7
	2	0	0	5	21.7	1	4.3	4	17.4	13	56.5			23	11.3
	3	0	0	2	13.3	1	6.7	3	20	9	60			15	7.4
	4	3	2.2	29	21.6	23	17.2	25	18.7	54	40.3			134	65.7

P≤0.05 is statistically significant

Interpretation

Comparison of knowledge of dental students with respect to their responses and gender.

Q1: Because the p values for gender and year of study are 0.119 and 0.223, respectively, there is no statistically significant difference (p value > 0.05) in dental students' awareness of the meaning of stress fractures. This is the case regardless of whether the students are male or female.

The knowledge of dental students on the most affected areas of stress fractures is not statistically significant (p value > 0.05) with respect to gender, but it is statistically significant (p value 0.05) with respect to the year of study because the p values for these two factors are 0.994 and 0.028 respectively.

Because the p values for gender and year of study are 0.065 and 0.265, respectively, the knowledge of dental students regarding the significance of vitamin D in bone health is not statistically significant (p value > 0.05).
The knowledge of dental students about the symptoms of stress fractures is statistically significant (p value 0.05) in relation to gender, but it is not statistically significant (p value >0.05) in relation to the year of study, as the p values for this question are 0.047 and 0.620 respectively.

The knowledge of dental students about the management of stress fractures is not statistically significant (p value > 0.05) with respect to the gender, but it is statistically significant (p value 0.05) with respect to the year of study since the p values are 0.269 and 0.038 respectively. Q12: The knowledge of dental students regarding the management of stress fractures is not statistically significant (p value > 0.05).

CONCLUSION

The majority of athletes that suffer from stress fractures are younger than 25 years old. Stress fractures afflict 20 percent of all athletes. Stress fractures can happen to anyone who is active on a regular basis, from weekend warriors to elite athletes.

REFERENCES

[1]. Bennell, K;. Matheson, G;. Meeuwisse, W;. Brukner, P. Risk factors for stress fractures. Sports Med. 1999, 28, 91-122.
[2]. Kiel, .J Kaiser, K. Srtes Reaction and Fractures, StatPearls Publishing: Treasure Island, FL, USA, 2020.
[3]. Parikh, H. (2021), “Diatom Biosilica as a source of Nanomaterials”, International Journal of All Research Education and Scientific Methods (IJARESM), Volume 9, Issue 11
[4]. Fredericion, M;. Jennings, ;E. Beaulieu, ;C. Matheson, G.O. Stress fracturesni athletes. Top. Magn. Reson. Imaging 2006, 17, 309-325.
[5]. Lawley, R:. Syrop, I.P; Fredericson, M. Vitamin Dfor improved bone health and prevention of stress fractures: Areview of the literature. Cierr. Sports Med. Rep. 2020, 19, 202-208.
[6]. Davey, T;. Lanham-New, S.A.; Shaw, A.M.; Hale, B.; Cobley, R.; Berry, J.L; Roch, M.; Allsopp, A.J.; Fallow field, J.L. Low serum 25-hydroxyvitamin Dsi associated with increased risk of stress fracture during Royal Marine recruit training, Osteoporos. Int. 2015, 27, 171-179.
[7]. Milgrom, ;C. Giladi, M.; Stein, M.; Kashtan, H;. Margulies, :.J Chisin, ;R. Steinberg, R.; Aharonson, Z. Stress fractures in militaryrecruits. Aprospective study showing an unusually high incidence. .J Bone J.f Surg. B.r Vol. 1985, 732-735.
[8]. Ruchola, J.-P. Laaksi, I.; Ylikomi, ;T. Haataja, R;. Mattila, V.M.; Sahi, T.; Tuohimaa, P; Pihlajamäki, I. Association between serum25(OH)D concentrations and bone stress fractures in Finnish young men. .J Bone Min. Res. 2006, 21, 1483-1488.
[9]. Richards, ;T. Wright, .C British Army recruits with low serum vitamin D take longer to recover from stress fractures. .J R. ArmyMed. Corps 2018, 2018, 000983.
[10]. Tilwani K., Patel A., Parikh H., Thakker D. J., & Dave G. (2022), “Investigation on anti-Corona viral potential of Yarrow tea”, Journal of Biomolecular Structure and Dynamics, 1-13.
[11]. Parikh, H. (2021), “Algae is an Efficient Source of Biofuel”, International Research Journal of Engineering and Technology (IRJET), Volume: 08 Issue: 11.
[12]. Shapiro, M;. Zubkov, K;. Landau, R. Diagnosis of Stress fractures ni military trainees: Alarge-scale cohort. BMJ Mil. Health 2020, 2020, 001406.
[13]. Wentz, L Liu, P.-Y.; Haymes, .E Ilich, J.Z. Females have agreater incidence of stress fractures than malesni both military and athletic populations: Asystemic review. Mil. Med. 2011, 176, 420-430.