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A STUDY OF DIETARY PATTERN IN ''AMERICAN FOOTBALL PLAYERS" OF AGE 19-28 YEARS.

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ABSTRACT

The Present investigation entitled "A study of Dietary Pattern in American football Players' of age 19-28 Years'' 'was undertaken with the aim to report nutrient intake profiles of American football players and to see the relationship between major nutrients and anthropometric measurements like height, weight, BMI. The present study was conducted on 28 American football players in India from different regions like Punjab, Haryana, Chandigarh, Maharashtra and Karnataka. The evaluation of various components of nutrition like carbohydrate, protein and fat in daily diet of the subjects was carried out using MSU Nutriguide software standardized by Song et al (1992). The results revealed that the players were tall and heavy, and had high values of BMI as per average reference range. The analysis of daily diet intake reveals lower consumption of Carbohydrates and higher consumption of protein and fat when compared to normal recommendations by ICMR/NIN. The value of carbohydrate intake was 11% (approx.) less. Whereas the consumption of protein was 3% (approx.) and fat was 8 % (approx.) higher than as recommended. The high value of protein and fat consumption may be explained because of the high intake of milk and milk products in some athletes and supplements in some others. The tendency to consume high protein and fat due to the notion that the body needs high protein and energy for the exhaustive training and event pattern results in the overdoing. Thus, it can be concluded that in order to improve performance, the athletes not only need expert guidance regarding diet practice, but also a change in their perception of 'healthy food' specific to their sport.

KEY WORDS: *American football Players, height, weight, exhaustive training and event pattern.*

INTRODUCTION

Globalization and industrialization has led to the exchange of not only currency but culture and life style across countries around the world. American football originating from the support of rugby football, also known as gridiron evolved in the United States is a popular game at professional, college and high school level. It was only until recently that it found its way to India. The Elite Football League of India (EFLI) is a professional American football league founded in 2011, is based in India. The aim of the league is to introduce and popularized American football in Indian market. The league management's idea is to allure current rugby and other players from India over to the sport. EFLI comprises of eight teams, seven of whose franchises are based in India and one in Sri Lanka. American football is known for having some of the biggest athletes in professional sports with linemen weighing the heaviest. Football requires strength, speed, agility, endurance and explosiveness. It is played as an explosive sport, and the plays often last between 2 to 15 seconds. In most cases, all strength and power are put out in a few shots then you get a chance to rest up

and do it again. So, both aerobic and anaerobic elements are involved in this sport, with a lot of technique and risk of injury.

Success in sports depends on three factors - genetic endowments, the state of training and nutrition. Genetic make-up cannot be changed. Specialized exercise training is the major means to improve athletic performance and proper nutrition is an important component of the total training program. Athletes and fitness enthusiasts need the same essential nutrients that non-active people need with varied increases in their caloric needs as well as some increase in macro and micronutrients. Therefore, it is essential to explore and assess these increased nutritional needs of athletes before, during, and after competition for achieving optimal sports performance. The nutrients in foods offer four general functions: energy for every cell in the body, growth and repair of tissue, regulation of metabolism, and provision of water for every cell.

There are 3 energy nutrients that provide calories to fuel the cells. Carbohydrates provide 4kcal per gram and can be generally classified as "complex" or "simple". Physically active people and athletes should consume a majority (65-75%) of their calories from carbohydrates. Lipids (fat) provide 9kcal per gram and can be generally classified as unsaturated and saturated when considering the fatty acid make-up of triglycerides. It is generally recommended to consume less than 30% of calories from lipids. Proteins give 4 kcal per gram and will be approximately 10-15% of one's total calorie needs, if the appropriate grams for number of calories are chosen. A fourth contributor to energy is alcohol that provides 7 kcal per gram, but can impair athletic performance.

Protein is one of the most important nutrients in the maintenance of good health and vitality. It is of vital importance in the growth and development of all body tissues. It provides a major source of building materials for blood, muscles, skin, hair, nails, and glands, as well as for hormones, enzymes, and antibodies. It is difficult not to get enough protein if one eats an appropriate number of calories for his bodyweight. There are dangers of overdosing on 2-3 times the recommended amount of protein. Dangers are weight gain if too many calories are eaten, water loss (dehydration) if carbohydrates are not consumed, excess calcium excretion (which can lead to osteoporosis), and possible kidney problems from the burden of its excretion. In addition, consumption of high animal protein over and above recommended daily allowance (RDA) is associated with the risk of heart disease and colon cancer.

Athletes do not generally need extra protein unless they are trying to gain muscle mass or they engage in endurance sports. The Recommended Daily Allowance (RDA) for protein for most people is 0.8 grams per kilogram of bodyweight and it is 1.0 to 1.5 grams per kilogram of bodyweight for endurance athletes and bodybuilders. Additional recommendations include increasing plant proteins for the added benefits and keeping the percentage to 10-15% of total calories for any person who is within their appropriate caloric range.

The active body uses proteins as a fuel (a minor source of fuel) to meet 2% - 5% of energy needs during rest and low/moderate exercise, while, it provides 10% - 15% of energy needs during endurance exercise. A carbohydrate-rich diet spares protein from being used as fuel. For a kg of body weight, 1.2 gm of protein is generally recommended (up from typical 0.8 gm protein/kg body weight) and even up to 2.0 grams for individuals participating in certain events. Protein needs are easily met by a normal diet. Therefore, protein supplements are not at all necessary.

Excessive protein has not been shown to be beneficial for athletes. Rather, such intakes may be deleterious to performance. However, in the menu planning for the athletes in the Indian diet, protein intake may exceed 2 gms / kg body weight. (reported by Brooks1987) Hard exercise increases protein needs. Intense exercise activates specific enzymes in the muscle that degrade the myo- fibrillar protein. Protein loss occurs through sweat and urine because of decreased absorption in kidney tubules during heavy exercise

A poor or inadequate diet can lead to fatigue, irritability, and sometimes to eating disorders such as anorexia. Training and diets will vary according to the type of activity being undertaken. Adequate intakes of complex carbohydrates are essential for all athletes, especially after crucial events lasting over one hour.

Carbohydrate loading or 'super-compensation' practices are designed to maximize the storage of glycogen and prevent the early onset of fatigue. Re-hydration can also prevent fatigue and assist athletes to sustain the intensity of a training session.

The nutrition composition for athletes' diet with special reference to energy contribution from carbohydrate, protein and fat varies from event to event i.e., 55-65% of carbohydrate, 12-15% of protein (of which 55-60% from animal protein) and 25-30% of fat. The ratio between these macronutrients has to be adjusted time to time depending on the needs of the individual athlete keeping in view event specificity so as to achieve desirable body size and composition, and optimal performance levels. Many coaches make dietary recommendations based on their own "feelings" and past experiences rather than rely on available scientific evidence**.** This problem is compounded by the fact that athletes often have either inadequate or incorrect information concerning prudent dietary practices as well as the role of specific nutrients in the diet.

Generally, athletes do not require additional nutrients beyond those obtained from a balanced diet. it is well documented that the rate of energy metabolism increases as much as 20-fold from base level during peak performance. However, the athlete may not use this high level of energy for long periods. In addition, the post event dietary needs of athletes are also important for repair and regeneration of the tissue and replenish the glycogen stores. Thus, meeting the needs of players with regard to energy, proteins, fats, minerals and vitamins is very crucial. Majority of these nutrients perform very essential roles in the metabolic processes of the body. Deficit of any nutrient would impair performance. This may not be evident immediately. Hence, it is important to maintain proper records of diets actually consumed by the players and changes in their body composition and physiological parameters in relation to performance. That would help in planning and combating malnutrition problems by modifying their diets time- to- time to achieve optimal performance.

MATERIAL AND METHODS –

The study of Dietary Pattern in "American Football players" was conducted on 28 physically fit males playing inter-university level, between the age group 19-28years. The players were mainly from Punjab, Chandigarh, Haryana, Maharashtra and Karnataka with diverse dietary habits.

A detailed self-developed basic nutritional awareness questionnaire and three day '24 hours dietary recall method' was used along with basic anthropometric measurements.

The data thus collected has been discussed as follows-

- Body height, weight, BMI, BMR
- Total energy intake in terms of calories
- Total Intake from carbohydrates, Protein and Fats
- Percentage of calories each from carbohydrates, protein and fats

BMI

It is the appropriateness of the subject's weight relative to height. It is calculated with following formula

BMI = weight in kg/height in mts^2

BMR

It is the minimal rate of energy consumption necessary to support all cellular functions and accounts for 50-70% of total energy expenditure in humans.

It is calculated with Harris and Benidict's equation-

BMR = 66+(13.7weight) +(5 height) – 6.8 age

Calculation of total Nutrient intake

The evaluation of nutrient intake in daily diet and energy expenditure was done by using 'MSU Nutriguide 'computer software program standardized by Song et al. (1992)

RESULTS AND DISCUSSION—

The present investigation entitled "Study of Dietary Pattern in "American football players " was conducted to determine the nutritional awareness of inter- university players. Since the sport has been recently introduced in India, no previous study is available related to Indian population specifically related to American Football, hence the relevance and importance of this research. The athletes, although were concerned with their fitness and performance, had little idea about authentic and scientific basis of nutrition. Many of them relied on their coaches or fellow athletes for dietary advice, and many of them followed good old traditional dietary patterns, which consisted of more than abundant use of ghee and other dairy products. The athletes are thus presented with poor advice or inaccurate and possibly damaging information.

This can also be compared to the study of Ifigenia et al, (2013) which states that in team sports, athletes sought advice primarily from their physician (18.6%), and to a lesser degree from their coach (11.8%) and nutritionist (4.7%). And also this advice source differed in case of individual athletes, who sought advice mainly from their coach (16.8%) and less from nutritionists (8.3%) and physicians (8.2%).

The study of diet intake of 28 athletes has been observed and the results are presented and discussed below. The sample taken belonged to various regions of India, i.e. Punjab(8), Haryana(9), Chandigarh(4), Maharashtra(2) and Karnataka(5) provided scatter to the data in terms of both anthropometric variations, as well as diversity of food habit showing to regional customs and availability. The results can be discussed under following points-

Age – The age group chosen for the study was between 19 years and 28 years, which can be seen in (fig 1)

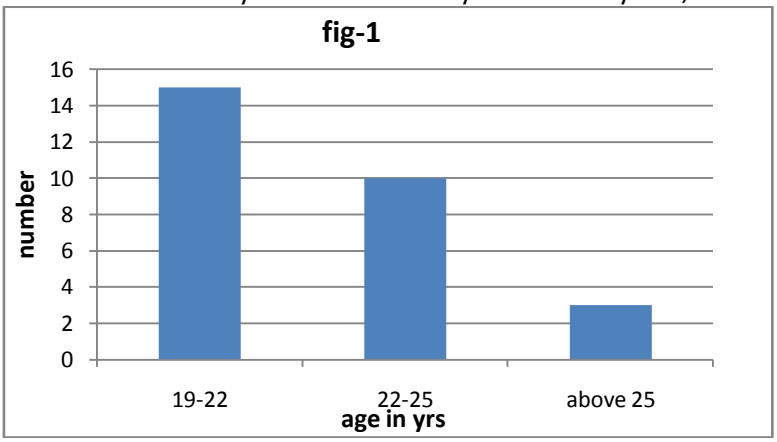
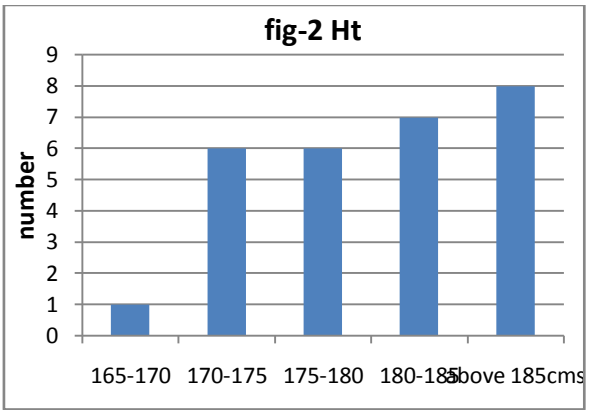


Table 1 –Body height, weight, BMI and BMR.

	Mean	S.D.
Height (cms)	179.82	±6.21
Weight (kgs)	85	±14.20
BMI (kg/m^2)	26.22	±3.71
BMR(kcal/day)	1827	±221.65

Height

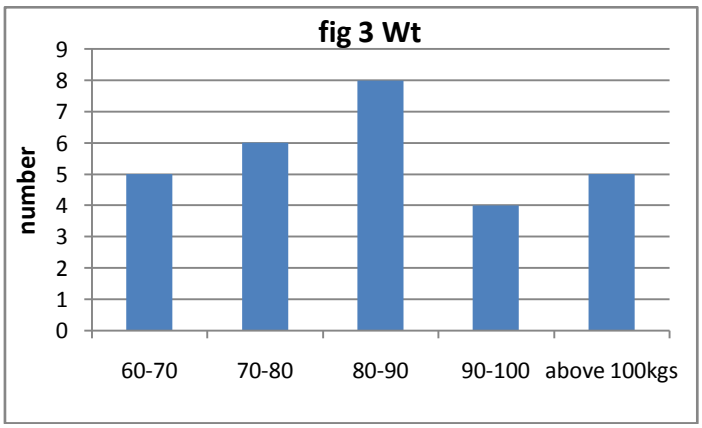
As it can be seen from Table 1, the mean height was calculated to be 179.82cms, with a standard deviation of ± 6.21. It is clearly above the value of reference man considered by ICMR, 2010, which is 173cm.Thus we can conclude that the average height of American football athletes is more than average Indian man, which is fact required considering the aggressive and offensive nature of the sport.



Weight-

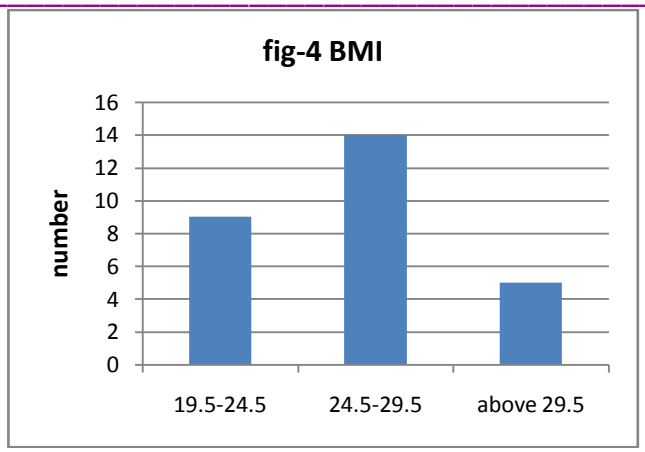
Again as in Table 1, the mean weight of the athletes was calculated to be 85kgs and the S.D. was ±14.20, which is again above the value of reference man given by ICMR. The heavy body is helpful in this kind of sport and can be explained by related height and athletic physique.

However, when compared to the athletes of Group-1 event category (power events of higher weight category, boxing, weight lifting, wrestling, judo) of NIN classification, this mean coincides with the reference mean i.e.,85 kgs.



BMI-

The BMI of the reference male is taken to be 20.3 according to ICMR. The Table 1 states that the mean BMI of the athlete was 26.22kg/m^2 with the S.D. of ± 3.71, which is above the normal range of 19.5 – 24.5kg/m^2. But this reference range cannot be considered to label these athletes as obese, as it is the muscle mass which accounts for the greater value of the BMI and not fat.



Also, in comparison, the average BMI of an average NFL player for the season 2012 was 31.35kg/m^2, with the highest BMI of an athlete to be 45.64kg/m^2.

BMR-

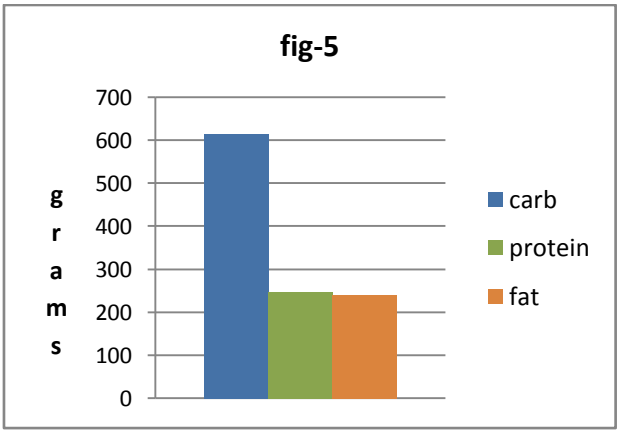
The mean BMR of an average Indian man according to ICMR (2010) is 1515k.cal. The mean BMR of the athletes in the study was calculated to be 1827 kcal with an S.D. ±221.65, which is evidently way above the average value. This can be explained on account of the larger muscle mass in these athletes and their premium level of physical activity.

Total calories, Carbohydrates, Protein and fat

The total calories, calories from CHO, protein and fat along with their S.D. are presented in table (3) and figure (5) as under-

Table 3

	Mean	S.D.	Cal./Per Kg/Body wt
Total kcalories	5446.98	±2190.50.	118.08
Carbohydrate	613.4g	±233.	7.21
Protein	246.92g	±124.58	2.09
Fat	239.19g	±155.02	2.81



Total Calories –

The total calories consumed by the athletes, as depicted in Table 1 was calculated to be 5446.9 kcal, and the S.D. ± 2190.54. This is approximately1956 kcal (i.e. 56%) more than the mean energy RDA for a heavy working Indian male according to ICMR(2010) , which is 3490k.cal.

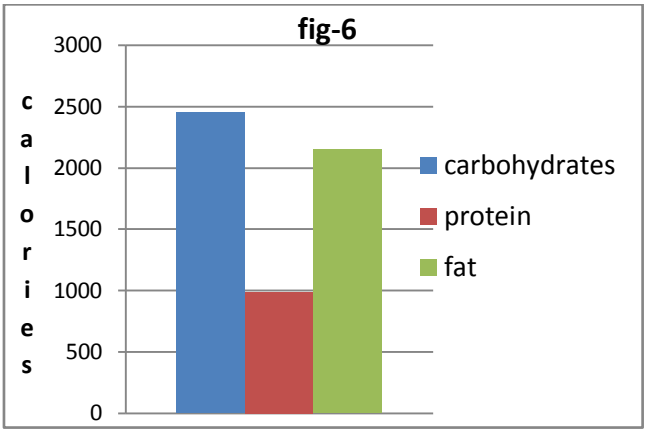
However, when compared to the total calorie allowance for athletes of Group-1 event category(power events of higher weight category, boxing, weight lifting, wrestling, judo) of NIN classification of sports and games according to energy expenditure ,which is 6000k.cal/day, the mean intake calculated in the study was lower by550k.cal (i.e.approx.9%).moreover, American football is far more demanding in terms of strength, power and endurance , and hence energy requirement than the sports included in Group-1 category sports. This deficit is more relevant because the mean weight in both cases is the same. Thus, it can be concluded that the athletes were consuming lesser calories than they should, thus compromising their optimum performance.

Carbohydrates, Protein and fat

The calories contributed by carbohydrates, protein and fat are presented as the following table (4) and figure (6)

Table 4

	Mean k.calories	Percentage of total calories
Carbohydrates	2452.5	43.86%
Protein	987.6	17.65%
Fat	2151	38.47%



Carbohydrate-

From table 2 and table 3, it can be seen that the mean carbohydrate intake was 613.4gms with S.D.± 233.64, which is 7.21g/kg body weight. It provides approx.2452.5 k.cal, and contributes 43.86% of the total calories consumed. The percent of calories allowed from carbohydrates for Group -1 event sports by NIN is 55%. Therefore, the athletes are utilizing less proportion of calories from carbohydrates than recommended. Regular use of calories lower than required results in decrease in body weight, lethargy, motor- task difficulties and ultimately reduced sports performance. When lesser carbohydrates are consumed, this

deficit is compensated with the use of protein as energy source. This deteriorates lean body mass maintenance and thus performance.

Protein-

Similarly, the Tables show that the mean protein intake is 246.92g, with S.D. ±124.5, which provides 987 kcal i.e. 17.65% of the total calories consumed. But if per kg body weight consumption of protein by the athletes under study was calculated to be 2.9g/kg, which is almost double the amount recommended by NIN (1.0 to 1.5 grams per kilogram of for endurance athletes and bodybuilders) to maintain nitrogen balance and lean body mass. Estimates of protein requirements have undergone considerable evolution in recent times, as it has considerably reduced as compared to first recommendation of 1g protein/kg body weight was made by the League of Nations in 1936.

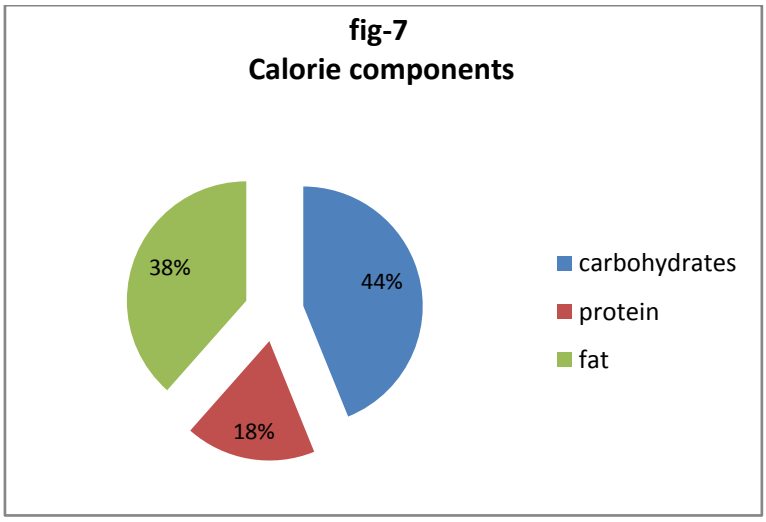
Also, if compared with the percentage of recommended calories from protein is considered, which is 15%, the intake is approx. 3%more than that of the study i.e.17.65%.

Fat—

Finally, the mean amount of fat consumed by the understudy athletes was 239.19g and S.D. ±155.02, which comes out to be 2.81g/kg of body weight. It provides 2151k.cal and contributes 38.47% of the total calorie share. This percent is again higher as compared to the recommended percentage of fat for Group-1 event category athletes, which is 30%.

Long term use of high fat diet not only increases body weight and hinders athletic performance; it has been well documented as having association with cardiovascular disease, hypercholesterolemia, obesity, diabetes and other metabolic disorders. Thus, the proportional contribution of calories from carbohydrates, protein and fat is approx.**44%: 18%: 38%**

And the recommended ratio for Group-1 event sports is 55%: 15%: 30%, according to NIN. This difference further supports the ignorance regarding scientific and efficacious dietary habits for premium performance in athletes.



Correlation Analysis

From the analysis of correlation coefficient r between various parameters of the athletes (table -4), some pairs show positive r value, i.e. positive relationship. But the other relationships are not strong statistically (low r- value) and also not much significant (high p - value). For example, carbohydrate intake increases calorie intake, which in turn increases body weight, and is evident from the r value of carbohydrate and body weight(r=0.352), but the result although positive, doesn't show strong dependence. Body weight is

anyways dependent on many other factors like energy expenditure, age, sex, health status, other nutrients etc., along with calorie intake.

Likewise, protein and calorie intake also show positive relationship of average strength as the r value is 0.344. Some variables also show negative value like r value between CHO and protein, but the strength is insignificant. Besides, protein and CHO intake are anyways not much related, as their source in food items is independent to each other. Other r values don't show much strong relationships.

Also, it can be stated that in the present study, height and weight, BMI and weight, carbohydrates and calories, and fat and calories are showing significant results as their p values are more than 0.05. These results thus can be taken as significant for the present study. The rest of the p values are below 0.05, and thus considered statistically insignificant, although they are known to show mutual dependence practically and physiologically.

Correlation matrix (pearson's) Table-5

	Ht	Wt	BMI	Cal	CHO	Protein
Wt	r=0.531112 * p=.0036					
BMI	r=0.160532 p=0.4145	r=0.920115 * p=0				
Calories	r=0.104729 p=0.595	r=0.05375 p=0.7860	r=0.038437 p=0.8461			
CHO	r=0.099342 p=0.6151	r=-0.35211 p=0.0661	r=-0.44885 p=0.01659	r=0.501558 * P=0.0065		
Protein	r=0.29587 p=0.1264	r=0.237381 p=0.2240	r=0.148714 p=0.4501	r=0.344124 p=0.0729	r=-0.0291 p=0.8831	
Fat	r=0.124767 p=0.5272	r=0.107489 p=0.5959	r=0.082406 p=0.6767	r=0.89409* p=0	r=0.30929 P=0.1093	r=0.19176 p=0.3284

*result is significant at 0.05 level (two tailed)

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