

Chapter 1

The effects of eating fast

Overweight and obesity are characterized by an excess in body fat. The cells found in the adipose tissue are called the adipocytes and are responsible for storing the fat. The fat stored in these cells is in a semi-liquid state and consists of triglycerides and cholesterol ester. A fat cell measures in average 0,1 millimeter in diameter and can grow up to fifty times its size.

It is considered that an adult has an average of about 20 billion fat cells that can weigh up to 13,5 kilograms. In a healthy subject reaching its adult weight, the cells size increases by four and then divides and increases significantly. The number of adipocytes increases during childhood and adolescence while in adulthood the quantity remains rather constant. However when the adipocytes cells reach their maximum capacity, they can grow up to 10 times in order to increase the storage capacity. We can note that an individual becoming obese during adulthood will have less adipocytes than an individual whose pathology was reported in adolescence.



The adipocytes increase or lose their fat content but decreasing their number is not easy. The medical studies on tachyphagia show a strong correlation between the behaviour which consists of « eating quickly » and the fact of suffering of overweight, or obesity at all stages of life.

BMI : We consider that a person is overweight when its BMI (body mass index = weight in kg divided by the height in meter²) is between 25 and 30, obese when its BMI exceeds 30.

Eating-rate and overweight/obesity

	Counseling aimed at slowing the rate of ingestion could be promising behavioral treatments for obese persons	48 (24 males; 24 females) non-obese and pre-obese young adults
2015	Physiology & Behavior Jan;138:69-74.	Park S, Shin WS.
	Increasing portion size led to a larger bite size and faster eating rate, but a slower reduction in eating speed during the meal. Interventions to reduce bite size and slow eating rate may provide individuals with strategies to reduce the risk of overconsumption.	37 overweight women
2015	Physiology & Behavior Feb;139:297-302.	Almiron-Roig E, Jebb SA.
	Irregular meal pattern and more intra-meal drinking were associated with increased odds of general and abdominal obesity among Iranian adults.	7958 adults
2015	European Journal of Nutrition Apr 2.	Saneei P, Adibi P.
	The prevalence of self-reported binge eating was 55% (n=109).	197 women ages 20 to 65 being assessed for bariatric surgery with a BMI greater than 30kg/m(2)
2015	Eating Behavior Apr;17:130-5. doi: 10.1016/j.eatbeh.2015.01.014. Epub 2015 Feb 7.	Coker EL, von Lojewski A, Luscombe GM, Abraham SF.



<p>In multiple logistic regression models, eating rate was significantly and positively associated with metabolic syndrome. The multivariable-adjusted ORs (95% CI) for slow, normal and fast were 0.70 (0.62 to 0.79), 1.00 (reference) and 1.61 (1.53 to 1.70), respectively, in men (p for trend <0.001), and 0.74 (0.60 to 0.91), 1.00 (reference) and 1.27 (1.13 to 1.43), respectively, in women (p for trend <0.001). Of metabolic syndrome components, abdominal obesity showed the strongest association with eating rate. The associations of eating rate and metabolic syndrome and its components were largely attenuated after further adjustment for body mass index; however, the association of slow eating with lower odds of high blood pressure (men and women) and hyperglycaemia (men) and that of fast eating with higher odds of lipid abnormality (men) remained statistically significant.</p>		<p>56,865 participants (41,820 male and 15,045 female) who attended a health checkup in 2011 and reported no history of coronary heart disease or stroke.</p>
2014	BMJ Open. Sep 5;4(9):e005241.	Nagahama S, Mizoue T.



<p>Understanding mechanisms of food intake self-regulation (FISR). This review focuses on 4 behavioral indices of FISR in childhood: (1) eating in the absence of hunger; (2) eating rate; (3) caloric compensation and satiety responsiveness, and (4) food responsiveness. Evidence from pediatric samples around the world indicates that these traits are associated with body mass index, are heritable, and are linked to polymorphisms in the FTO gene</p>		<p>Evidence from pediatric samples around the world</p>
2014	Human Heredity 75(2-4):80-9. do	Myles S. Faith a Susan Carnell b Tanja V.E. Kral c



<p>Eating quickly was associated with excess gains in anthropometric variables. Stopping a habit of eating quickly prevents these excess gains.</p>		<p>3182 non-overweight/ obese schoolgirls (9-10 y)</p>
2013	European Journal of Endocrinology Aug 27	Ochiai H, Kokaze A.



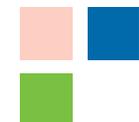
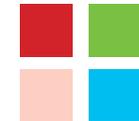
<p>Fast eating rates are associated with obesity and other cardiometabolic risk factors</p>		<p>8755 adults</p>
2013	Nutrition Metabolism Cardiovascular Diseases: NMCD. Jul;23(7):635-41	Lee KS, Cho KH.

	The risk of being overweight was 3.93 time higher for male eating quickly than for male eating slowly. This Odds ratio was 1.59 for female students eating quickly. As a comparison, the adjusted odds ratio of being overweight in male students who frequently reported eating a fatty diet was 2.72.		1918 students
	2013	Asia Pacific Journal of Public Health Jul;25(4):326-34	Ekuni D, Morita M.
	Eating quickly had a significantly greater association with risk of metabolic syndrome (risk of abdominal obesity combined with a risk of hypertension, diabetes, or hypercholesterolemia), for both sexes, than eating slowly or at a normal pace This studies also showed that skipping breakfast, eating quickly, and having a late night supper were independently associated with risk.		4912 adults (30-39y)
	2013	Nihon Koshu Eisei Zasshi. Japanese Journal of Public Health Feb;60(2):98-106	Soga Y, Shirai C, Ijichi A.
	The proportions of participants who were obese or who had elevated waist circumference levels increased progressively with increases in eating rate. These associations remained significant regardless of the age, sex, total energy intake, dietary fibre intake, current smoking, current drinking and regular exercise.		7275 individuals aged ≥40
	2013	Diabetologia. Jan;56(1):70-7	Ohkuma T, Kitazono T.



	<p>Among boys, fast eating speed significantly increased the odds ratio for overweight. Among boys eating until full, OR : 2,78 Among those not eating until full : 2,43 Among girls, fast eating speed led to a significant increase in the OR in those eating until full</p>	<p>3138 adolescents</p>
2013	Journal of Obesity 717942doi: 10.1155/2013/717942	Ochiai H, Kokaze A.
	<p>Across the categories of eating speed (slow, medium, and fast) a faster eating speed was associated with a higher prevalence of obesity.</p>	<p>2050 males</p>
2012	Metabolism: clinical and experimental Nov;61(11):1566-71	Sakurai M, Nakagawa H.
	<p>Rapid eating was significantly associated with body mass index. The BMI of those who reported eating quickly was 0.8 kg/m² higher than in individuals who reported eating at medium speed.</p> <p>Illustration : for 1m60 (5'3"), it makes an average difference of weight of about 2kg (4.4 Lbs) between two persons of 1m80 (5'9"), it makes an average difference of weight of about 2,6kg (5,7 Lbs)</p>	<p>762 patients with Type2 Diabetes (30-70 y)</p>
2012	Appetite Oct;59(2):252-5	Saito A, Sone H.

	<p>Rate of eating was positively associated with the risk of overweight, independent of protein, fat, and dietary fiber intakes.</p> <p>Odds ratio for overweight in very fast categories was: 4.49 in male children; 5.69 in female children;</p> <p>3.84 in male adolescents; 1.49 in female adolescents</p>	<p>24176 children (6-11y) and adolescents (12-15 y)</p>
<p>2012</p>	<p>Journal of Nutritional Science and Vitaminology (Tokyo). 58(4):247-52</p>	<p>Murakami K, Arakawa M.</p>
	<p>Compared with lean participants, obese participants had a higher ingestion rate and a lower number of chews per 1 g of food.</p>	<p>30 lean and obese young men</p>
<p>2011</p>	<p>American Journal of Clinical Nutrition Sep;94(3):162-70</p>	<p>Li J, Wang S.</p>
	<p>The group with metabolic syndrome (obesity, high blood pressure, low high-density lipoprotein cholesterol level, high triglyceride level, and high fasting blood glucose level) was more likely to eat quickly (OR 2.23 for fast vs slow) and to overeat frequently (OR 2.37, for more than 4 times a week vs less than once a week).</p> <p><i>Illustration : According to this odds ratio, if in a control group of 100 healthy people, 16 are fasteaters, in an equivalent group of 100 people but with metabolic syndrome 30 will be fast eater. If in the control group 16 overeat frequently, they are 31 in the other group</i></p>	<p>7081 men aged ≥30</p>
<p>2009</p>	<p>Journal of the American dietetic Association Apr;109(4):633-40</p>	<p>Shin A, Kim J.</p>



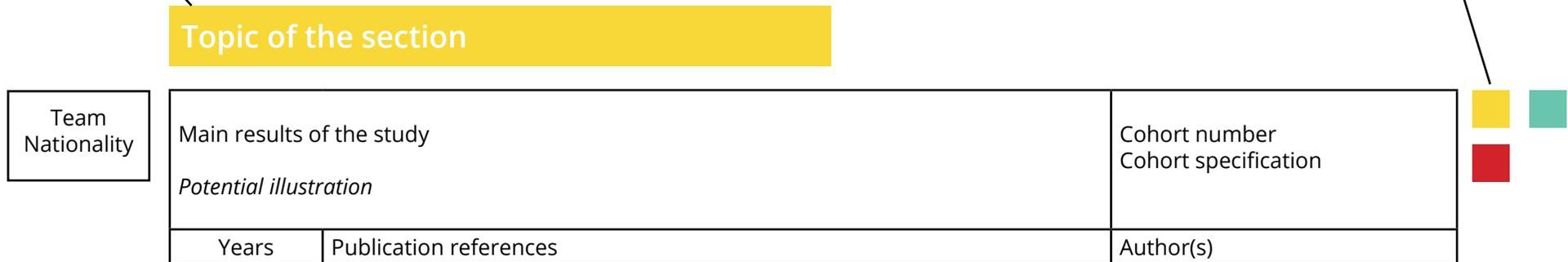
	<p>For both sexes the highest age adjusted mean values for height, weight, body mass index, and total energy intake were in the eating until full and eating quickly group compared with the not eating until full and not eating quickly group.</p> <p>The multivariable odds ratio of being overweight with both eating behaviours compared with neither was:</p> <ul style="list-style-type: none"> - 3.13 for men - 3.21 for women 	<p>3287 adults aged 30-69</p>
2008	BMJ Oct 21;337:a2002	Maruyama K, Iso H.
	<p>Current BMI steadily increased along with the progress of categorical rate of eating. Both BMI at age 20 and current height are positively associated with rate of eating.</p>	<p>3737 middle aged men and women (39-55y)</p>
2006	Journal of Epidemiology/ Japanese Epidemiological Association May;16(3):117-24	Otsuka R, Toyoshima H.
	<p>The rate of eating showed a significant and positive correlation with BMI. Only dietary fiber intake showed a weak correlation with BMI.</p> <p>Eating quickly = BMI Fiber intake = BMI</p>	<p>1695 18 years old females</p>
2003	International Journal of Obesity and Related Metabolic Disorders Nov;27(11):1405-10.	Sasaki S, Amano K.

	<p>The BMI of the male patients who ate quickly (average 25.4) were significantly higher than those of the patients who ate at a normal rate (average 24.4) or slowly (average 24.1).</p> <p><i>Illustration : Considering 3 patients being 1m70 tall (5'3"), the average weight is 73,4 kg (163 Lbs) for the fast eater, 70,5 (156,7 Lbs) for the normal eater and 69,6 kg (154,7 Lbs). It is an average difference of almost 4 kg between the fast and the slow eater.</i></p>	<p>422 patients with type 2 diabetes or hyperlipidaemia.</p>
<p>2002</p>	<p>Journal of International Medical Research Jul-Aug;30(4):442-4.</p>	<p>Takayama S, Sasaki T.</p>
	<p>Fire fighters who reported eating faster at the station than elsewhere gained 9.9 lb compared with 6.8 lb for all others.</p>	<p>438 firefighters (20-58y)</p>
<p>1996</p>	<p>Preventive Medicine Sep-Oct;25(5):593-600.</p>	<p>Gerace TA, George VA.</p>
	<p>Increased meal length was associated with greater weight loss.</p>	<p>10 obese women</p>
<p>1991</p>	<p>Behavior Therapy Volume 22, Issue 1, Winter, Pages 61-67</p>	<p>Theresa A., Gary D. Foster</p>

Presentation of the studies

Color of the section

Color of the related topic the study treats



Color by section :

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|---|-----------------|--|--------------|---|-------------------|
|  | Satiety |  | Diabetes |  | Portion Size |
|  | Food Intake |  | GERD |  | Mindful eating |
|  | Obesity |  | Food quality |  | Gastric surgery |
|  | Metabolic Risks |  | Chewing |  | Scientific Method |