CLINICAL PRACTICE GUIDELINE

The Prevention and Treatment of Obesity

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SUMMARY

Background: The high prevalence of obesity (24% of the adult population) and its adverse effects on health call for effective prevention and treatment.

Method: Pertinent articles were retrieved by a systematic literature search for the period 2005 to 2012. A total of 4495 abstracts were examined. 119 publications were analyzed, and recommendations were issued in a structured consensus procedure by an interdisciplinary committee with the participation of ten medical specialty societies.

Results: Obesity (body-mass index [BMI] ≥ 30 kg/m²) is considered to be a chronic disease. Its prevention is especially important. For obese persons, it is recommended that a diet with an energy deficit of 500 kcal/day and a low energy density should be instituted for the purpose of weight loss and stabilization of a lower weight. The relative proportion of macronutrients is of secondary importance for weight loss. If the BMI exceeds 30 kg/m², formula products can be used for a limited time. More physical exercise in everyday life and during leisure time promotes weight loss and improves risk factors and obesity-associated diseases. Behavior modification and behavioral therapy support changes in nutrition and exercise in everyday life. With respect to changes in lifestyle, there is no scientific evidence to support any particular order of the measures to be taken. Weight-loss programs whose efficacy has been scientifically evaluated are recommended. Surgical intervention is more effective than conservative treatment with respect to reduction of bodily fat, improvement of obesity-associated diseases, and lowering mortality. Controlled studies indicate that, within 1 to 2 years, a weight loss of ca. 4 to 6 kg can be achieved by dietary therapy, 2 to 3 kg by exercise therapy, and 20 to 40 kg by bariatric surgery.

Conclusion: There is good scientific evidence for effective measures for the prevention and treatment of obesity.

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Obesity is a significant issue for health policy because it is so widespread in the population as a whole, and because of the high risk of complications it carries (1). According to the findings of the DEGS study (Studie zur Gesundheit Erwachsener in Deutschland, German Health Interview and Examination Survey for Adults) carried out between 2008 and 2011 by the Robert Koch Institute in a cohort representative of the whole population, 23.3% of men and 23.9% of women were obese (2). The prevalence of obesity increases four-fold with age in both men and women in an age-dependent manner. In the period from 1999 to 2009, in particular, the prevalence of persons with a body mass index (BMI) of 35 kg/m² or higher rose markedly (3).

Obesity is implicated in a wide variety of health problems such as impaired sense of wellbeing and impaired quality of life, numerous complications, high frequency of sick leave and early retirement, and increased mortality. The health-related complications are due to the increased proportion of body fat and associated disturbances of endocrine/metabolic function and due to increased mechanical load. Fatty tissue does not only store energy, it is also an active endocrine organ that is closely connected to the intermediary metabolism.

Method

Twelve experts from ten medical professional societies/organizations took part in developing the Guideline (*eBox*). The literature search and evaluation of the evidence were carried out by the German Agency for Quality in Medicine (ÄZQ, Ärztliches Zentrum für Qualität in der Medizin) on behalf of the German Obesity Association (DAG, Deutsche Adipositas-Gesellschaft). Five guidelines identified as relevant were evaluated using the German instrument for the methodical evaluation of guidelines (DELB, Deutsches Leitlinien-Bewertungsinstrument) and the key recommendations extracted. A total of 4495 abstracts were identified as published during the period covered by the literature search (from 2005 to March 2012). The MedLine database was searched via www.pubmed.org. In addition, other relevant publications dated up to April 2014 and located by the experts in a manual search were taken into account, so it may be assumed that no studies were missed that would fundamentally undermine the statements contained in the

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Weight loss on four different types of diet with different ratios of macronutrients. Study in 811 men and women (BMI 25 to 40 kg/m²) aged 30 to 70 years and with various carbohydrate:protein:fat ratios (%) (13).

Guideline (*eFigure*). The selection (defined inclusion and exclusion criteria) and evaluation of the studies (in accordance with SIGN, the Scottish Intercollegiate Guidelines Network, *eTable*) were carried out by personnel of the ÄZQ. The recommendations formulated on the basis of the evidence tables and source guidelines were agreed during structured consensus conferences and during the Delphi process that followed (moderated by the ÄZQ). The final version of the Guideline was produced after external expert review.

The statements below reproduce the main content of the Guideline. The complete texts are available at www.adipositas-gesellschaft.de.

Obesity—a disease

The World Health Organization (WHO), the German Federal Court, the European Parliament, and the German Obesity Association regard obesity as a chronic disease caused by a complex interaction between genetic factors and environmental or lifestyle factors, which carries increased morbidity and mortality and needs lifelong treatment. Because it is a heterogeneous disorder, individualized assessment, risk stratification, and treatment are required.

Prevention of obesity

Given that obesity is so prevalent, and given how difficult it is to treat, prevention is particularly important. To prevent overweight and obesity, people should eat and drink according to their nutritional needs, get regular exercise, and check their weight regularly (evidence level [EL] 1–4, recommendation grade [RG] A, *eTable*). So far as nutrition is concerned, they should consume less food with a high energy density and more food with a low energy density (EL 2, RG B). Foods

that have a low energy density due to their high water or fiber content, such as wholegrain products, fruit, and vegetables, are comparatively more filling and have a low energy content (4). According to the German College of General Practitioners and Family Physicians (DEGAM, Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin), there is insufficient evidence to support the proposition that persons with a BMI over 25 kg/m² should avoid energy-dense foods. The German Society of Nutritional Medicine (DGEM, Deutsche Gesellschaft für Ernährungsmedizin) also says that a Mediterranean diet helps prevent overweight and obesity.

The Guideline also states that consumption of alcohol, fast food, and sugary drinks should be reduced (EL 2, RG B) (5). Fast food often contains a high proportion of fat and sugar and is thus very energy-dense (6). Not only drinks sweetened with sugar, but fruit juices and juice-based drinks too, have a high sugar content and are not very filling (7).

An inactive lifestyle with frequent sitting watching television or on the internet and similar activities promotes weight gain (EL 1–4, RG B). Getting exercise in everyday activities and as a leisure pursuit has a preventive effect. This goal is best achieved by endurance-focused physical exercise (use of large muscle groups) for more than 2 hours per week (8).

Who should lose weight?

Whether treatment is indicated for overweight and obesity depends on patient BMI and body fat distribution, taking into account any co-morbidities, risk factors, and patient preferences (EL 4, RG A). The following are indicators for treatment:

- BMI ≥ 30 kg/m² (obesity)
- BMI of 25 to 30 kg/m² (overweight) with concomitant
 - overweight-related health impairments (e.g., hypertension, type 2 diabetes mellitus) or
 - abdominal obesity or
 - diseases that are exacerbated by overweight or
 - high psychosocial distress.

Weight loss is contraindicated for persons with wasting diseases and for pregnant women.

Treatment for obesity

Goals

Treatment goals should be realistic and adapted to the individual patient (e.g., experiences, resources, risks) (EL 4, RG B). Goals are:

- Long-term weight reduction:
 - BMI 25 to 35 kg/m²: >5% of initial weight
 - BMI > 35 kg/m²: >10% of initial weight
- Improvement in obesity-related risk factors
- Reduction in obesity-related diseases
- Lowering of risk of early death
- Prevention of inability to work and early retirement
- Reduction of psychosocial disorders
- Improvement of quality of life

TABLE 1

Effect of various forms of dietary therapy on body weight in overweight/obese persons*

No. of participants	Study type	Duration	Effect	Reference
Low-fat diet only				
1910	Meta-analysis of 19 RCTs in adults	2–12 months	–3.2 kg (–1.9 to –4.5 kg), extra weight loss † (–2.6 kg) per 10 kg higher weigh	(10)
Dietary therapy				
6386 intervention 5407 “usual care”	Meta-analysis of 46 RCTs	> 4 months	Weight reduced by 1.9 BMI units or 6% of initial weight	(14)
Low-carbohydrate vs. low-fat weight reduction diet				
447	Meta-analysis of 5 RCTs	6 months, 12 months	After 6 months: greater weight loss of –3.3 kg (–5.3 to –1.4 kg) on low-carbohydrate diet; after 12 months: difference in weight no longer seen (–1.0 kg [–3.5 to 1.0 kg, n.s.])	(11)
High-protein vs. low-protein diet				
1086	Meta-analysis of 15 RCTs	n.d.	High-protein diet leads to a greater reduction in body weight, by –0.39 kg (–1.43 to 0.65 kg, n.s.)	(15)
Mediterranean diet				
3436	Meta-analysis of 16 RCTs in adults	n.d.	All studies: –1.75 kg (–2.86 to –0.64 kg), studies with restricted calories: –3.88 kg (–6.54 to –1.21 kg)	(16)
Recent original data				
811	RCT, various combinations of macronutrients: 20% F/ 15% P/ 65% CH 20% F/ 25% P/ 55% CH 40% F/ 15% P/ 45% CH 40% F/ 25% P/ 35% CH	24 months	After 6 months, weight loss of 6 kg in all arms, after 2 years moderate weight loss of 4 kg, no difference between diets	(13)
772	RCT, commercial group program vs. “standard care” under family doctor	12 months	–5.1 vs. –2.25 kg (LOCF), dropout rate: 42%	(28)

*Meta-analyses and RCTs were chosen for quality based on number of participants, study duration, control intervention, and variables measured/measuring methods. n.d., not given; F, fat; P, protein; CH, carbohydrate; LOCF, last observation carried forward; n.s. not significant; RCT, randomized controlled trial

Dietary therapy

Obese individuals should received personalized nutritional recommendations adapted to their therapeutic goals and risk profile (EL 4, RG A). This can only be successful over the long term if the patient agrees to a change in lifestyle and recommendations that are practicable in daily life. No valid studies have been published on this recommendation.

To carry out dietary therapy, nutritional counseling (individual or in groups) should be offered within the program of medical management (EL 1, RG A). Group sessions are usually more effective than individual sessions. The DGEM gives a recommendation grade of B rather than A.

For weight reduction, patients should be recommended forms of nutrition that over a long enough time

lead to an energy deficit but do not impair health (EL 1–4, RG A).

To reduce body weight, the aim should be to follow a reduction diet that will produce an energy deficit of about 500 kcal/day, or more in individual cases (EL 1–4, RG B). To achieve this, various nutrition strategies may be employed (EL 1–4, RG 0):

- Reduce fat consumption
- Reduce carbohydrate consumption
- Reduce both fat and carbohydrate consumption

The DGEM states that wide-ranging literature exists for this recommendation and a recommendation grade of A is justified.

An energy deficit of 500 to 600 kcal/day will allow weight loss to occur at around 0.5 kg/week over a period of 12 up to a maximum of 24 weeks (9). The

TABLE 2

Effects of physical activity on weight loss in terms of body weight and abdominal fat, depending on type of activity, intensity, and duration*

No.	Characteristics	Duration	Participation (%)	Physical activity			Body weight (kg)	Abdominal fat (%)	Comments	Reference
				Type	Intensity	Duration				
202	Men and women, 40–75 years	12 months	93	Endurance training	60–85 % max. heart rate	6 x 60 min/week	Women -1.4 (-1.8) men -1.8 (-1.8)	Women -4.8 men -7.5	Association found between duration of activity and weight changes and proportion of body fat ("dose-effect relationship")	(19)
				Controls		-	Women +0.7 (+0.9) men -0.1 (+0.9)	No significant changes		
249	Men and women, 18–70 years	3 months	-	Strength training	8–12 repeats	3 x 30 min/week	+0.7 (2.4)	0.5	Well-controlled study with supervision and food logs. Strength training had no measurable effect, not even in combination with endurance training.	(20)
			90	Endurance training	Approx. 75% max. O ₂ uptake	3 x 30 min/week	-2.0 (3.8)	-8.4		
			82	Strength and endurance training	See above	6 x 30 min/week	-2.1 (3.2)	-7.1		
1847	14 studies, meta-analysis	12 weeks to 12 months		Endurance training	Varied widely	Varied widely	-1.7 (-2.29 to -1.11)		Only two studies had a training duration greater than 225 min/week. There was a positive dose-effect relationship.	(21)
3476	43 studies, Cochrane	12 months		Endurance training	Varied widely	Varied widely	-2.0 (-2.1 to -0.7)			(22)

*Studies were chosen for quality based on number of participants, study duration, control, and variables measured/measuring methods. Data are given as means and confidence intervals or standard deviation.

consumption of fat, which in Germany is still high, can be reduced by simple steps (10). A low-carb diet will lead to sharper weight loss at the beginning than other diets, but after a year the difference can no longer be seen (11). Several large studies in the past few years have shown convincingly that the macronutrient composition (ratio of fats to carbohydrates to protein) has no relevance for weight loss (*Figure 1*) (12, 13). Various reduction diets (fat reduction alone, low-carb diet, reduced-energy balanced diet, Mediterranean diet) lead to loss of around 4 kg in 1 to 2 years (*Table 1*). Individual experience, knowledge, and resources are more important than nutrient relationships. The DGEM regards a recommendation grade of B rather than 0 as justified for this procedure.

To attain the therapeutic objective, the use of formula products supplying 800 to 1200 kcal/day may be considered (EL 1, RG 0). This form of nutrition is recommended for persons with a BMI of 30 kg/m² or more for a maximum of 12 weeks; weight loss of 0.5 to 2.0 kg/week may be expected (17). This treatment should be carried out under a physician's supervision because of the increased risk of side effects (EL 1, RG A). In the opinion of the DGEM, formula diets have been well investigated in high-quality cohort studies and for this reason a recommendation grade of A rather than 0 is favored. Formula diets are the most effective diet method for initial weight reduction.

Extremely one-sided diets should not be recommended because of the high medical risks they entail and their lack of long-term success (EL 4, RG A). Diets involving extreme nutrient distributions (e.g., so-called crash diets) are widely followed in Germany. No robust studies on their effectiveness and safety have been published. Since their effectiveness and safety are unknown, they cannot be recommended.

Increased exercise

Effective weight loss requires >150 min/week of exercise with an energy consumption rate of 1200 to 1800 kcal/week (8). Strength training alone is not very effective for weight reduction (EL 2–4, RG B) (18). The amount of energy used up during exercise is often overestimated. When large muscle groups are used, the intensity is moderate to high, and the exercise work is of long duration, weight loss can be expected. Well-controlled studies and meta-analyses show a weight reduction of about 2 kg and about a 6% loss of abdominal fat in 6 to 12 months (*Table 2*).

It should be ascertained that overweight and obese persons do not have any contraindications to additional physical activity. This is particularly the case for patients with a BMI of 35 kg/m² or higher (EL 4, RG B).

Overweight and obese persons should have the health advantages (metabolic, cardiovascular, and psychosocial) of physical activity explained to them, which accrue irrespective of loss of weight (EL 4, RG A). Even in obese individuals, the health value of increased exercise is seen in more than just a loss of weight (23).

Interventions for behavior modification

Interventions based on a behavioral approach, in a group or individual setting, should form part of a program of weight reduction (EL 1, RG A). The intervention should be aimed primarily at altering lifestyle in terms of nutrition and exercise and may be carried out by qualified non-psychotherapists. If the symptoms accompanying overweight or obesity are more serious (e.g., co-morbid depression, eating disorders, motivation problems), psychiatrists or psychotherapists should be involved in the patient management, and patients should be supported in their dietary therapy and exercise (24).

Various strategies are available for intervention. They should be adapted to the individual situation and the wishes of the patient involved (25) (Box).

Weight reduction program

Obese patients should be offered weight reduction programs that are adapted to their individual situation and targeted at the therapeutic goals (EL 4, RG B). The weight reduction programs should include the elements of the basic program (exercise, diet, and behavioral

BOX

Strategies for weight reduction may have the following psychotherapeutic elements (EL 1–2, RG 0):

- Self-observation of behavior and progress (body weight, amount eaten, exercise)
- Practicing flexible, controlled eating and exercise behavior (as opposed to rigid behavioral control)
- Stimulus control (stimulus = external trigger for eating)
- Strategies for handling returning weight gain
- Social support
- Cognitive restructuring (modification of dysfunctional thought patterns)
- Agreeing goals
- Problem-solving training/conflict resolution training
- Social competence training/assertiveness training
- Reinforcement strategies (e.g., rewarding changes)
- Preventing relapse

TABLE 3

Commercial programs for weight reduction in Germany for which at least one study has been published in a peer-reviewed journal*

	“Ich nehme ab” ^{*1} (DGE)	“Abnehmen mit Genuss” ^{*2} (AOK)	Weight Watchers	Bodymed	M.O.B.I.L.I.S	Optifast-52
Mean BMI (kg/m ²)	Around 30	31	31,4	33,4	35,7	40,8
Number of participants	Various studies	45 869	772 (377 Weight Watchers)	665	5025	8296
Formula diet	No	No	No	Yes	No	Yes
Probands weighed	Yes	Self-reported	Yes	Yes	Yes	Yes
Δ kg (1 year)	Not stated	Not stated	–5.1 (LOCF, Weight Watchers) –2.3 (LOCF, controls)	–9.8 (LOCF)	–5.1 (BOCF)	–16.4 (LOCF)
Δ kg (1 year) women	–2.3/–2.0/ –1.3	–2.2 (BOCF)	Not stated	Not stated	–5.0 (BOCF)	–15.2 (LOCF)
Δ kg (1 year) men	–4.1	–2.9 (BOCF)	Not stated	Not stated	–5.9 (BOCF)	–19.4 (LOCF)
Dropouts	16%–35%	51%	39% (Weight Watchers)	23%	14%	42%
Type	RCT	Observation	RCT	Observation	Observation	Observation
Study quality	RCT studies with and without personal counseling	All participants in Germany from 2006 to 2010	RCT outcome in comparison to standard advice from doctor	Selected sample (from approx. 500 Bodymed centers in Germany)	316 groups from 2004 to 2011	All participants, all centers in Germany from 1999 to 2007
Reference	(26)	(27)	(28)	(29)	(30)	(31)

* Where several publications were available for one program, the publication in the journal with the highest impact factor was chosen; DGE, Deutsche Gesellschaft für Ernährung (German Nutrition Society); AOK, Allgemeine Ortskrankenkasse (a large general statutory health insurance company); BMI, body mass index; LOCF, last observation carried forward; BOCF, baseline observation carried forward; RCT, randomized controlled trial

^{*1} “Let’s lose weight”

^{*2} “Enjoy losing weight”

therapy) (EL 1–2, RG A). *Table 3*, which gives an overview, includes only programs for which published data are available.

The DGEM mentions that obese persons should only be offered programs that have received a positive assessment, which are geared to the individual situation and the therapeutic goals. Programs whose effectiveness is not clear, because (for example) there are no measured data to show the course of body weight over time, should be excluded.

Weight-reducing drugs

Drug therapy should only be carried out in combination with a basic program (diet, exercise, behavioral therapy). The only drug that may be considered is orlistat (EL 1, RG A). Orlistat treatment is indicated in patients with a BMI above 28 kg/m² who also have other risk factors or co-morbidities, or with a BMI ≥30 kg/m² who have less than 5% weight loss after 6 months on the basic program (32).

Patients with type 2 diabetes mellitus and a BMI ≥30 kg/m² may, if their glycemic control is inadequate on metformin, also use GLP-1 mimetics and SGLT2 inhibitors (EL 1, RG 0). These drugs should be considered as an alternative to antidiabetic drugs that promote weight increase, such as sulfonylureas, glinides, glitazones, and insulin (33).

The DEGAM states that insufficient study data exist for GLP-1 analogs in relation to clinical end points. It points out that they may be associated with an increased risk of pancreatic disease.

Drugs such as amphetamines, diuretics, human chorionic gonadotrophin (HCG), testosterone, thyroxine, and growth hormones, and medical products / dietary supplements should not be recommended as a way to lose weight (EL 4, RG A). The drugs have an unacceptable risk–benefit ratio, and in regard to the medical products and dietary supplements, evidence of their effectiveness is lacking.

Long-term weight stabilization

Measures to stabilize body weight long term should take into account aspects of diet, exercise, and behavioral therapy together with the motivation of the patient involved (EL 4, RG B).

To support weight stabilization, treatments and consultations should be made available over the long term after successful weight loss, and should include cognitive behavioral therapy (EK 1, RG A) (34).

Patients should be advised, after a period of weight reduction, to maintain an increased level of physical exercise (EL 1–2, RG A). Experience has shown that almost all patients who maintain their weight after a period of weight loss have remained or become physically active (35). After losing 7 to 14 kg, physically active persons regain half their lost weight within 1 to 2 years (*Table 4*).

Patients should be told that a low-fat diet will help prevent weight regain (EL 1–2, RG B) (39). In persons who lost 12 to 24 kg on a very low calorie diet, weight

TABLE 4

Weight stabilization: change in body weight and abdominal fat due to increased physical activity (phase 2) following weight reduction (phase 1)*

Number	Characteristics	Overall duration	Phase 1: Weight reduction (kg) by reduction diet and exercise	Phase 2: Physical activity						Comments	Reference
				Type	Participation (%)	Intensity	Energy use/ duration	Body weight (kg)	Abdominal fat (%)		
202	Men and women 25–50 years	30 months	–7.7 kg in 6 months	Walking	79		Approx. 1200 kcal/week	+6.7 kg in 24 months		Even high activity cannot entirely prevent some weight gain	(36)
			–15.1 kg in 6 months	Walking	77		> 2500 kcal/ week	+3.0 kg in 24 months			
97	Men and women 21–46 years	18 months	–12.3 kg in 6 months by reduction diet	Treadmill	82	80% max. heart rate	2 x 40 min/ week	+3.1 kg in 12 months	+1.6	Endurance and strength training reduce gain in weight and abdominal fat	(37)
				Strength apparatus	79	80% 1RM	2 x 40 min/ week	+3.9 kg in 12 months	+0		
				Control group				+6.1 kg in 12 months	+25		
2796	Men and women over 18 years on the registry	> 1 year	Weight reduction of > 13.6 kg	Walking 81% Weight training 29% Cardio machines 15%		Varied widely	> 1000 kcal/ week 25% > 3000 kcal/ week 35%			Weight was maintained for > 1 year if energy use of 2621 kcal/week, corresponding to activity of 60–75 min/day with moderate intensity or 34–45 min/ day with high intensity, was achieved	(38)

*Studies were chosen for quality based on number of participants, study duration, control, and variables measured/measuring methods. 1RM, 1 repetition maximum

TABLE 5

Weight maintenance after weight reduction by change of eating habits*

Studies/ meta-analysis	Phase 1: Weight loss	Phase 2: Weight maintenance		Reference
		Length of follow-up	Weight change	
Meta-analysis of 29 US studies	Average VLCD: 24.1 kg REMD: 8.8 kg	4.5 years (VLCD: 55% of initial participants, LCD: 80% of participants)	VLCD: -6.6% (-5.6 to -7.5%) of initial weight REBD: 2.1% (1.6 to 2.7%); no difference between sexes; with more activity: -12.5% (-11.2 to -13.7%)	(40)
Meta-analysis of 46 RCTs (Dietary counseling vs. "usual care")	Mean weight loss of 1.9 BMI units after 12 months (corresponds to -6%)	6 to 48 months	Regain of body weight by 0.02 to 0.03 BMI units per month (corresponds to approx 1 kg/year)	(14)
Meta-analysis of 20 RCTs	Weight loss of 12.3 kg on VLCD or LCD (< 1000 kcal/day)	18 to 36 months	Drugs: Effect of +3.5 kg, 3 RCTs, 658 participants	(e1)
		10 to 26 months	Meal replacements: +3.9 kg, 4 studies, 372 participants	
		3 to 12 months	High-protein diet: +1.5 kg, 6 studies, 865 participants	
		6 months	Other types of diet: +1.2 kg, 3 studies 564 participants	
		3 to 14 months	Dietary supplements: +/-0 kg, 6 studies, 261 participants	
		6 to 12 months	Exercise program: +0.8 kg, 5 studies, 347 participants	

*Meta-analyses were chosen for quality based on number of participants, duration of studies, control intervention, and variables measured/measuring methods. VLCD, very low calorie diet (< 800 kcal/day); LCD, low calorie diet (< 1000 kcal/day); REMD, reduced-energy mixed diet (energy deficit 500–600 kcal/day); RCT, randomized controlled trial

regain of < 5 kg was seen after 1 to 2 years on a reduced-energy balanced diet (Table 5).

Regular weighing contributes to better weight stabilization after successful weight loss (EL 4, RG B) (e2).

Surgical intervention in extremely obese patients

For extremely obese patients, surgical intervention should be considered (EL 1–3, RG A). Compared to conservative treatment, surgical treatment is more effective in terms of body fat reduction, improvement of obesity-related diseases, and reduction of mortality risk (e3–e5) (Figure 2).

Obesity surgery is indicated according to BMI as follows, if all conservative treatment methods have been unsuccessful (EL 4, RG A):

- Grade III obesity (BMI ≥ 40 kg/m²) or
- Grade II obesity (BMI ≥ 35 kg and < 40 kg/m²) with significant co-morbidities (e.g., type 2 diabetes) or
- Grade I obesity (BMI > 30 and < 35 kg/m²) in patients with type 2 diabetes (special cases)

If multimodal conservative therapy for 6 months leads to $\leq 10\%$ weight loss in patients with a BMI of 35 to 39.9 kg/m² and $\leq 20\%$ in those with a BMI of ≥ 40 kg/m², surgery should be considered (1). The DGEM states: surgery is indicated in patients with a BMI ≥ 40 kg/m² if $\leq 10\%$ of the initial weight has been lost. For patients with type 2 diabetes, the recommendation grade is B, as the data are insufficient.

Surgical treatment can also be given as a primary therapy, without any preceding conservative treatment, if conservative treatment is judged to have no chance of success or the patient's health does not allow surgery to be delayed in order to attempt improvement by weight reduction (EL 4, RG 0). Patients with severe concomitant disease, a BMI ≥ 50 kg/m², and difficult psychosocial circumstances are eligible. The DGEM regards surgery as indicated in patients who are immobile, in whom diet-based treatment has failed, and in those with a high insulin requirement.

Before surgery, patients should undergo an assessment that includes metabolic, cardiovascular, psychosocial, and dietary details (EL 4, RG A). After bariatric

Commonly used surgical methods to treat extreme obesity

- a) Sleeve gastrectomy
- b) Gastric banding
- c) Gastric bypass

(From: Runkel N, et al.: Clinical practice guideline: Bariatric surgery. Dtsch Arztebl Int 2011; 108(20): 341–6).

FIGURE 2

surgery, lifelong interdisciplinary follow-up is required (EL 4, RG A) (e6). For quality assurance, patients who undergo weight loss surgery should be entered in a central national register (EL 4, RG B).

Conflict of interest statement

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KEY MESSAGES

- Obesity (BMI ≥ 30 kg/m²) is a chronic disease.
- The high prevalence of obesity in adults (24%) means that effective prevention and treatment are required.
- For weight loss in obesity, and stabilization at the reduced weight, a diet resulting in an energy deficit of 500 kcal/day is effective. A low-energy diet is recommended; the ratios between macronutrients (fat, carbohydrates, protein) is of secondary importance.
- Behavior modification supports changes in diet and exercise in everyday living.
- In extremely obese patients, surgical treatment should be considered.

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For eReferences please refer to:
www.aerzteblatt-international.de/ref4214
eBox, eFigure, eTable:
www.aerzteblatt-international.de/14m0705

CLINICAL PRACTICE GUIDELINE

The Prevention and Treatment of Obesity

Alfred Wirth, Martin Wabitsch, Hans Hauner

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eBOX

Participating societies, organizations, and experts

The Guideline members represent the following medical societies and organizations

- **German Obesity Association (DAG, Deutsche Adipositas-Gesellschaft)**
 - Prof. H. Hauner
 - Prof. D. Kunze
 - Dr. M. Teufel
 - Prof. M. Wabitsch
 - Prof. A. Wirth
- **German Diabetes Association (DDG, Deutsche Diabetes-Gesellschaft)**
 - Prof. N. Stefan
- **German Society of Nutritional Medicine (DGEM, Deutsche Gesellschaft für Ernährungsmedizin)**
 - Prof. S.C. Bischoff
- **German Nutrition Society (DGE, Deutsche Gesellschaft für Ernährung)**
 - Dr. T. Ellrott
- **German College of General Practitioners and Family Physicians (DEGAM, Deutsche Gesellschaft für Allgemeinmedizin)**
 - Dr. C. Heintze
- **German Society of Sports Medicine and Prevention (DGSP, Deutsche Gesellschaft für Sportmedizin und Prävention)**
 - Prof. A. Berg
- **German Eating Disorder Society (DGEES, Deutsche Gesellschaft für Essstörungen)**
- **German College for Psychosomatic Medicine (DKPM, Deutsches Kollegium für Psychosomatische Medizin)**
- **German Society of Psychosomatic Medicine and Medical Psychotherapy (DGPM, Deutsche Gesellschaft für Psychosomatische Medizin)**
 - Dr. M. Teufel
- **Surgical Working Group for Adiposity Therapy (CAADIP, Chirurgische Arbeitsgemeinschaft für Adipositas therapie) of the German Society for General and Visceral Surgery (DGAV, Deutsche Gesellschaft für Allgemein- und Viszeralchirurgie)**
 - Prof. M. Colombo-Benkmann
- **Obesity Surgery Patient Support Group (AcSDeV, Adipositaschirurgie-Selbsthilfe Deutschland)**
 - U. Kanthak
- **Standing Commission on the Maintenance and Updating of DAG Guidelines (Ständige Kommission zur Pflege und Aktualisierung der DAG-Leitlinien)**
 - Dr. A. Moss

eTABLE

Classification (SIGN 2010) and evaluation of evidence. Evidence levels (EL) were divided into sublevels using + and – signs.

Evidence level		Description
1	1++	High-quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
	1+	Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
	1–	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2	2++	High quality systematic reviews of case control or cohort studies High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
	2+	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
	2–	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	3	Nonanalytic studies, e.g., case reports, case series
4	4	Expert opinion
Recommendation grade (RG)		Description
A		Strong recommendation
B		Recommendation
0		No recommendation
Consensus strength		Percentage of participants in agreement
Strong consensus		>95% of participants
Consensus		>75–95% of participants
Majority agreement		>50–75% of participants
No consensus		<50% of participants

RCT, randomized controlled trial

eFIGURE

*¹ Additional studies identified by the experts; of these, only systematic reviews/meta-analyses were analyzed

*² Guideline evidence tables are not included in the number of full-text publications on which this guideline is based

Excluded abstracts

- A1 Publication is on a different topic or a different research question, or is not specific to the current research question
- A1a Study investigated mainly or only children or adolescents
- A1b Limited representativity: particular groups of persons were under investigation (e.g., pregnant women)
- A1c Different cultural context, life circumstances, and eating habits
- A1d Animal study, not human study
- A1e Primary outcome not weight or BMI
- A2 Publication appeared before 2009 (end date of literature search for SIGN 2010 Guideline)
- A3 Publication unavailable in German or English
- A4 Publication does not describe a study (e.g., editorial, comments, notes), or results have not yet been published (e.g., study protocol)
- A5 Method is not described
- A6 Publication is not a systematic review or RCT
- A7 Full text is not available
- A8 Duplicate publication
- A9 Publication already included in a source included in the aggregated evidence