



## Effects of Mediterranean diet, exercise, and their combination on body composition and liver outcomes in metabolic dysfunction-associated steatotic liver disease: a systematic review and meta-analysis of randomized controlled trials

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Reviewed by OUR EXPERTS  With Expert Review from Sarah Cassar

Metabolic dysfunction–associated steatotic liver disease (MASLD) is highly prevalent among individuals living with obesity and represents a growing global health challenge. While diet and lifestyle modification are universally recognised as central to management, there remains considerable uncertainty among clinicians regarding the most effective dietary and exercise strategies.

This systematic review and meta-analysis of 37 randomised controlled trials critically evaluated the effects of the Mediterranean diet (MD), exercise, and their combination on anthropometric measures and liver-related outcomes in individuals with MASLD. The results demonstrated that both MD

and exercise, when implemented independently, produced modest yet consistent improvements in body composition and liver function, as reflected by reductions in alanine aminotransferase (ALT), reinforcing their clinical relevance for weight management and hepatic health in MASLD.

Although fewer trials examined combined diet-and-exercise interventions, the available evidence suggested additive benefits, with participants achieving approximately 1.5–2 kg of weight loss, reductions in waist circumference, and further improvements in liver function ■

## Replacing dietary carbohydrate with protein and fat improves lipoprotein subclass profile and liver fat in type 2 diabetes independent of body weight: evidence from 2 randomized controlled trials

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This study aimed to determine the effects of a short-term carbohydrate-reduced, high-protein (CRHP) diet (30% carbohydrate, 30% protein, 40% fat) on lipid metabolism, particularly lipoprotein density subclasses, compared with a conventional diabetes (CD) diet. A secondary analysis was conducted using data from two open-label RCTs in adults with T2DM...with all meals provided to maximise dietary adherence. Despite no differences in weight maintenance or loss between dietary groups in either study, the CRHP diet produced significantly greater improvements in atherogenic lipoprotein profiles. Notably, reductions were observed in triacylglycerol-rich lipoproteins, small dense low density lipoprotein (LDL) particles, and unfavourable high density lipoprotein (HDL) subclasses, alongside favourable shifts in the HDL2/HDL3 ratio. Importantly, intrahepatic triglyceride content was reduced to a significantly greater extent in the CRHP group in both trials, with changes closely correlated to improvements in lipoprotein subclasses. Collectively, these findings indicate that a CRHP diet can improve dyslipidaemia and liver fat accumulation in individuals with T2DM independently of weight loss, highlighting its potential as a targeted dietary strategy to reduce atherogenic risk and metabolic liver disease ■



## Early Time-Restricted Eating Improves Weight Loss While Preserving Muscle: An 8-Week Trial in Young Women

TAKESHI UEDA, ZIFU YU  
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Time restricted eating (TRE) works on the principle of confining the daily eating window to a relatively short duration. During the extended fasting period, beneficial metabolic processes, such as improved insulin resistance, weight loss, and fatty acid oxidation may be enhanced.

This 8-week study aimed to determine whether an early TRE (eTRE), eating within an 8:00am-2:00pm, or delayed TRE (dTRE), eating between 12:00pm-6:00pm, best enhances resistance training adaptations. The results showed that eTRE resulted in greater weight loss than both dTRE and control without any detrimental effects on muscle thickness and push-up performance. The authors concluded that eTRE appears to be more beneficial than dTRE for weight management, without hindering muscle adaptations when combined with resistance exercise ■

## Cardiometabolic Parameter Change by Weight Regain on Tirzepatide Withdrawal in Adults With Obesity: A Post Hoc Analysis of the SURMOUNT-4 Trial

DEBORAH B HORN, BRUNO LINETZKY, MELANIE J DAVIES, ET AL.  
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Tirzepatide, a dual glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptor agonist, has demonstrated substantial efficacy for weight reduction and improvements in anthropometric and metabolic parameters in the SURMOUNT-4 RCT. However, treatment withdrawal was associated with weight regain and a reversal of metabolic benefits, despite the continuation of lifestyle interventions.

This analysis aimed to quantify the extent of weight regain following cessation of therapy. A total of 308 participants who achieved  $\geq 10\%$  weight loss after 36 weeks of tirzepatide treatment were included in the analysis. The findings revealed that, among individuals with obesity, treatment discontinuation led to  $\geq 25\%$  weight regain in a substantial proportion of participants within one year, accompanied by a pronounced deterioration in cardiometabolic outcomes ■