

**Review Article****Time-Restricted Eating and Body Composition in Adults with Overweight: A Randomized Controlled Trial****Zarins L<sup>1\*</sup>, Bruun F<sup>2</sup> and Oja R<sup>3</sup>**<sup>1</sup>Department of Clinical Nutrition, Riga Stradins University, Riga, Latvia<sup>2</sup>Department of Endocrinology and Metabolism, Aarhus University, Aarhus, Denmark<sup>3</sup>Department of Public Health Nutrition, University of Tartu, Tartu, Estonia

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**Abstract**

**Background:** Time-restricted eating (TRE) confines food intake to a fixed daily window and has become popular for weight management in overweight adults. **Objective:** To synthesise randomised trial and meta-analytic evidence on TRE and body composition. **Methods:** Narrative review of published randomised trials, systematic reviews/meta-analyses, and mechanistic studies. **Findings:** TRE produces modest weight loss (1-4% of baseline) comparable to continuous energy restriction, driven mainly by fat mass loss, with lean mass generally preserved. **Conclusions:** TRE is a viable, low-burden weight-management option, though superiority over calorie counting remains unproven.

**Keywords:** time-restricted eating; intermittent fasting; body composition; fat mass; overweight

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**Background:** Time-restricted eating (TRE) confines food intake to a fixed daily window and has become popular for weight management in overweight adults. **Objective:** To synthesise randomised trial and meta-analytic evidence on TRE and body composition. **Methods:** Narrative review of published randomised trials, systematic reviews/meta-analyses, and mechanistic studies. **Findings:** TRE produces modest weight loss (1-4% of baseline) comparable to continuous energy restriction, driven mainly by fat mass loss, with lean mass generally preserved. **Conclusions:** TRE is a viable, low-burden weight-management option, though superiority over calorie counting remains unproven.

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## Introduction

Overweight and obesity affect more than two billion adults worldwide, with global prevalence continuing to rise across nearly every region [1]. Sustained adherence to conventional daily caloric restriction is notoriously difficult, prompting interest in dietary strategies that modify the timing rather than the composition of intake. Time-restricted eating (TRE) compresses habitual food consumption into a daily window of typically 4 to 10 hours, leaving the remaining hours as an extended overnight fast [2]. Interest in TRE grew rapidly after smartphone-based tracking revealed that free-living adults often eat across windows of 14 hours or more, frequently late into the evening, a pattern associated with adverse metabolic profiles [3]. Aligning food intake with circadian rhythms of glucose tolerance, lipid handling and gut hormone secretion offers a plausible mechanistic rationale for metabolic benefit independent of any deliberate reduction in energy intake [4]. Early rodent and small human feasibility studies suggested that TRE alone, without explicit calorie counting, could produce clinically

meaningful weight loss and favourable shifts in body composition [5]. Because body composition outcomes-namely fat mass loss relative to lean mass preservation-determine whether weight loss translates into genuine metabolic and functional benefit, this narrative review synthesises randomised controlled trial and meta-analytic evidence on TRE and body composition in adults with overweight and obesity, situating the findings within the broader intermittent fasting literature and considering the biological mechanisms, comparative efficacy, safety, and translational challenges of this dietary approach. Unlike alternate-day fasting or the 5:2 pattern, which manipulate the amount of intake on specific days, TRE leaves daily energy targets largely unspecified and instead restricts the clock hours during which eating occurs, making it conceptually distinct even though the two approaches are often discussed together in the wider intermittent fasting literature [6,7]. This distinction matters clinically because it determines whether observed weight and fat loss reflect an unintentional caloric deficit, a genuine circadian effect, or some combination of both, a question this review returns to repeatedly when comparing TRE against calorie-matched control diets.

## Time-Restricted Eating Protocols and Study Designs (Table 1)

Trials of TRE vary considerably in eating-window duration, timing relative to circadian phase, and concurrent energy restriction, complicating direct comparison of body composition outcomes (Table 1). Early studies such as the 8-hour feeding pilot in adults with obesity used an unsupervised, ad libitum approach within the window and reported spontaneous reductions in energy intake of roughly 350 kcal/day [5]. Subsequent feasibility work using a 10-hour early window in overweight adults similarly relied on self-selected timing without dietitian-prescribed calorie targets [8]. Larger

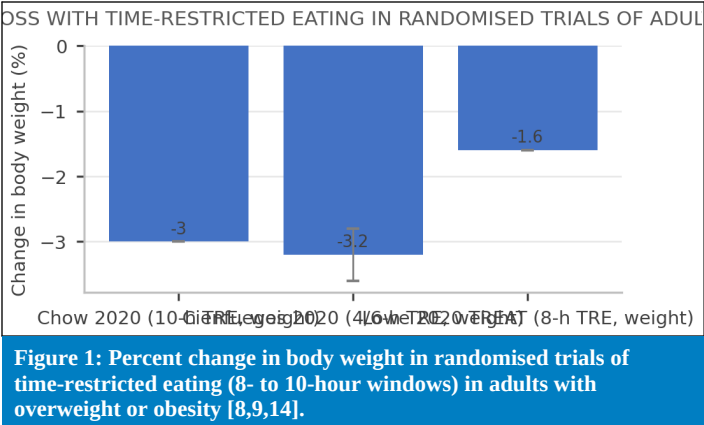
randomised trials have since compared TRE with matched or unmatched continuous energy restriction, isocaloric feeding, or habitual diet, and window lengths have ranged from 4 to 10 hours [9,10,11,12]. Some protocols additionally manipulate window timing, contrasting early (morning-centred) with mid-day or delayed windows to isolate circadian from purely restrictive effects [13]. This heterogeneity in design is an important lens for interpreting the comparative body composition findings summarised below.

| Table 1: Selected randomised controlled trials of time-restricted eating in adults with overweight or obesity reviewed here [5,8,9,10,11,13,12]. |                     |                                       |             |                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------|-------------|--------------------------------------------------------|
| Study                                                                                                                                            | Eating window       | Design                                | Duration    | Key body-composition outcome                           |
| Gabel 2018                                                                                                                                       | 8-h, unsupervised   | Pilot, pre-post                       | 12 weeks    | Spontaneous ~350 kcal/day deficit; modest weight loss  |
| Chow 2020                                                                                                                                        | 10-h, self-selected | Feasibility RCT                       | 12 weeks    | ~3% weight loss; reduced visceral and subcutaneous fat |
| Cienfuegos 2020                                                                                                                                  | 4-h vs 6-h          | RCT vs control                        | 8 weeks     | Significant fat mass loss, similar between windows     |
| Jamshed 2019                                                                                                                                     | 6-h, early          | Randomised crossover, metabolic ward  | 4 days/arm  | Improved 24-h glucose; reduced fat oxidation markers   |
| Wilkinson 2020                                                                                                                                   | 10-h                | Single-arm pre-post                   | 12 weeks    | Weight and fat loss with reduced atherogenic lipids    |
| Sutton 2018                                                                                                                                      | 6-h, early (eTRF)   | Randomised crossover                  | 5 weeks/arm | Improved insulin sensitivity without weight loss       |
| Maruthur 2024                                                                                                                                    | 8-h, isocaloric     | RCT vs matched continuous restriction | 6 months    | Weight loss comparable to continuous restriction       |

Effects on Body Weight and Fat Mass (Figure 1)

Across randomised trials in adults with overweight or obesity, TRE consistently produces weight loss in the range of roughly 1-4% of baseline body weight over 8-12 weeks, with fat mass accounting for the majority of that loss (Figure 1) [8,9,14]. In a feasibility trial using a 10-hour

eating window, participants lost approximately 3% of body weight, with imaging-confirmed reductions in visceral and subcutaneous fat, despite no explicit instruction to restrict calories [8]. A randomised comparison of 4-hour and 6-hour daily eating windows in adults with obesity found both produced significantly greater weight and fat mass loss than a no-intervention control, with similar efficacy between the two shorter windows [9]. The 12-month TREAT trial, one of the larger rigorously controlled studies, found that an unsupervised 8-hour TRE protocol produced modest but statistically significant weight loss relative to a three-meals-per-day control, again with fat mass contributing disproportionately to the loss [14]. Mechanistic trials pairing early TRE with metabolic ward assessment have likewise documented reduced fat mass alongside improved 24-hour glucose profiles even in the absence of large absolute weight change [10,13].



Preservation of Lean Mass and Comparisons with Continuous Energy Restriction (Figure 2)

A central question for clinical relevance is whether TRE preserves fat-free mass better than, worse than, or comparably to continuous daily caloric restriction (Figure 2). The pragmatic, isocaloric randomised trial by Maruthur and colleagues found that an 8-hour TRE window produced weight loss statistically

indistinguishable from a matched continuously restricted diet, implying that the timing manipulation itself does not confer an independent fat-mass-specific advantage once total energy intake is equalised [12]. Consistent with this, the landmark 12-month calorie-restriction trial by Liu and colleagues found that adding an 8-hour TRE window to a prescribed calorie-restricted diet did not enhance weight loss, fat loss, or lean mass preservation beyond calorie restriction alone [15]. A pragmatic trial explicitly testing TRE without calorie counting against calorie counting in a racially diverse cohort similarly reported comparable weight and fat mass changes between approaches, with no meaningful between-group difference in lean mass retention [16]. Systematic reviews reinforce this picture: pooled analyses show TRE and continuous energy restriction yield similar percentage reductions in fat mass, while lean mass loss as a proportion of total weight loss appears broadly comparable across the two approaches, though some resistance-exercise-paired protocols report better strength and lean mass retention [17,18].

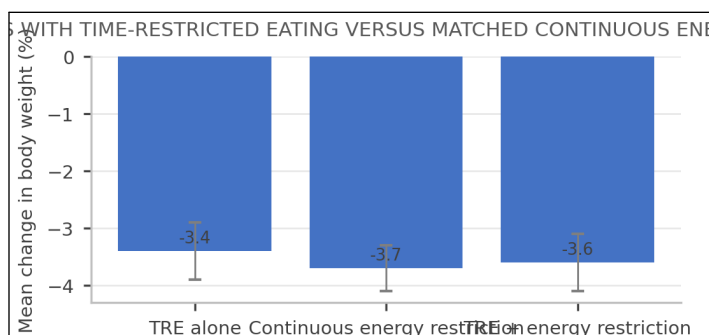


**Figure 2: Mean change in body weight with time-restricted eating alone, continuous energy restriction alone, or the two combined, from isocaloric and calorie-restriction-controlled randomised trials [12,15,18].**

## Mechanisms: Circadian Biology and Metabolic Switching

The proposed mechanisms behind TRE's body composition effects extend beyond simple caloric displacement. Extended overnight fasting intervals promote a shift from glucose to fatty acid and ketone

oxidation, a process termed the metabolic switch, which may enhance lipolysis and preserve lean tissue during energy deficit [19]. Aligning intake with the circadian peak in insulin sensitivity and beta-cell responsiveness, typically earlier in the day, may also improve glucose disposal and reduce lipogenic drive [2,4]. Early-window protocols in men with prediabetes improved insulin sensitivity, blood pressure and oxidative stress markers even without significant weight loss, suggesting metabolic benefits partly independent of body composition change [13]. Comprehensive mechanistic reviews describe additional pathways including modulation of autophagy markers, circadian clock gene expression, and gut microbial diversity, though most human evidence for these pathways remains preliminary [20,10]. Animal and cell-based work also implicates brown and beige adipose tissue thermogenesis and altered bile acid signalling as candidate contributors to preferential fat oxidation under restricted feeding schedules, but translation of these mechanisms into measurable human fat mass change has not yet been convincingly demonstrated in controlled trials, and most of the mechanistic gains described above are inferred from short mechanistic substudies rather than the larger pragmatic body composition trials summarised elsewhere in this review [2].

## Evidence Synthesis Across Trials and Meta-Analyses (Table 2)

Several systematic reviews and meta-analyses have now pooled TRE trials to quantify body composition effects with greater precision (Table 2). An early meta-analysis across predominantly uncontrolled and controlled studies estimated mean weight loss of roughly 1-4% and modest but consistent fat mass reduction, with the effect attenuated in trials with active comparator diets [21]. A subsequent meta-analysis restricted to studies in adults with excess weight likewise found significant reductions in body weight and fat mass with TRE relative to no

intervention, though effects versus continuous energy restriction were smaller and often non-significant [22]. A meta-analysis focused specifically on metabolic efficacy across randomised trials confirmed comparable weight and fat loss between TRE and continuous restriction, with no significant difference in fat-free mass change [18]. An umbrella review of meta-analyses covering multiple intermittent fasting regimens, including TRE, alternate-day fasting and 5:2 fasting, concluded that all produced small-to-moderate reductions in body weight and fat mass without consistently outperforming standard calorie restriction [23]. Broader narrative synthesis of intermittent fasting regimens generally corroborates that fat mass, rather than lean mass, is the primary tissue compartment lost under time-restricted feeding schedules [7,6].

| Table 2: Selected systematic reviews and meta-analyses of time-restricted eating and intermittent fasting on body weight and composition [21,22,18,23,6]. |                                               |                                         |                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------|---------------------------------------------------------------------|
| Synthes is                                                                                                                                                | Scope                                         | Studies pooled                          | Key quantitative finding                                            |
| Pellegrini 2020                                                                                                                                           | TRE vs control/comparator diets               | Systematic review/meta-analysis         | ~1-4% weight loss; modest fat mass reduction                        |
| Moon 2020                                                                                                                                                 | TRE, metabolic disease outcomes               | Systematic review/meta-analysis of RCTs | Significant weight and fat loss vs no intervention                  |
| Liu 2022 (JCEM)                                                                                                                                           | TRE vs continuous energy restriction          | Meta-analysis of RCTs                   | Comparable weight/fat loss; no significant fat-free mass difference |
| Patikorn 2021                                                                                                                                             | Intermittent fasting regimens incl. TRE       | Umbrella review of meta-analyses        | Small-to-moderate weight/fat loss across regimens                   |
| Varady 2021                                                                                                                                               | Intermittent fasting, cardio metabolic health | Narrative synthesis of RCTs             | Fat mass, not lean mass, is primary tissue lost                     |

**Safety, Adherence and Clinical Considerations**

TRE has generally shown a favourable safety profile across trial populations, with adverse events limited mainly to transient hunger, irritability and mild headache during

the initial adaptation period [24,25]. Adherence, measured by self-reported window compliance, has ranged widely from roughly 60% to over 90% depending on window length and supervision intensity, with shorter and stricter windows generally showing lower long-term sustainability [11,26]. Pilot studies embedded in primary care settings suggest TRE can be delivered with minimal dietitian contact and still yield reductions in waist circumference, an important consideration for scalability [25]. Nonetheless, few trials have followed participants beyond 12 months, and data in populations with disordered eating history, shift workers, or older adults with sarcopenia risk remain sparse, warranting caution in extrapolating these findings broadly [27,20]. Virtual and app-supported delivery models have also been tested as a scalable alternative to in-person coaching, reporting fasting glucose and modest weight improvements comparable to clinic-based protocols, which may support wider real-world implementation once longer-term safety data accumulate [27].

**Conclusion**

Across randomised controlled trials and meta-analyses, time-restricted eating produces modest, clinically meaningful weight loss in adults with overweight and obesity, with fat mass accounting for most of that loss and lean mass generally preserved to a degree comparable with continuous energy restriction. TRE does not appear to confer body-composition benefits beyond those achievable with matched caloric restriction, but its simplicity, favourable safety profile and comparable efficacy make it a reasonable, low-burden option for patients who find rigid calorie counting unsustainable. Larger, longer-duration trials with standardised body composition measures are needed to clarify durability and identify which patient subgroups benefit most.

## References

1. NCD Risk Factor Collaboration (NCD-RisC) (2024) Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults. *The Lancet*, 403(10431): 1027-1050. [https://doi.org/10.1016/S0140-6736\(23\)02750-2](https://doi.org/10.1016/S0140-6736(23)02750-2) PMID: 38432237
2. Longo, V.D., Panda, S. (2016) Fasting, Circadian Rhythms, and Time-Restricted Feeding in Healthy Lifespan. *Cell Metabolism*, 23(6): 1048-1059. <https://doi.org/10.1016/j.cmet.2016.06.001> PMID: 27304506
3. Gill, S., Panda, S. (2015) A Smartphone App Reveals Erratic Diurnal Eating Patterns in Humans that Can Be Modulated for Health Benefits. *Cell Metabolism*, 22(5): 789-798. <https://doi.org/10.1016/j.cmet.2015.09.005> PMID: 26411343
4. Regmi, P., Heilbronn, L.K. (2020) Time-Restricted Eating: Benefits, Mechanisms, and Challenges in Translation. *iScience*, 23(6): 101161. <https://doi.org/10.1016/j.isci.2020.101161> PMID: 32480126
5. Gabel, K., Hoddy, K.K., Haggerty, N., Song, J., Kroeger, C.M., Trepanowski, J.F., Panda, S., Varady, K.A. (2018) Effects of 8-hour time restricted feeding on body weight and metabolic disease risk factors in obese adults: A pilot study. *Nutrition and Healthy Aging*, 4(4): 345-353. <https://doi.org/10.3233/NHA-170036> PMID: 29951594
6. Varady, K.A., Cienfuegos, S., Ezpeleta, M., Gabel, K. (2021) Cardiometabolic Benefits of Intermittent Fasting. *Annual Review of Nutrition*, 41: 333-361. <https://doi.org/10.1146/annurev-nutr-052020-041327> PMID: 34633860
7. Tinsley, G.M., La Bounty, P.M. (2015) Effects of intermittent fasting on body composition and clinical health markers in humans. *Nutrition Reviews*, 73(10): 661-674. <https://doi.org/10.1093/nutrit/nuv041> PMID: 26374764
8. Chow, L.S., Manoogian, E.N.C., Alvear, A., Fleischer, J.G., Thor, H., Dietsche, K., Wang, Q., Hodges, J.S., Esch, N., Malaeb, S., Harindhanavudhi, T., Nair, K.S., Panda, S., Mashek, D.G. (2020) Time-Restricted Eating Effects on Body Composition and Metabolic Measures in Humans who are Overweight: A Feasibility Study. *Obesity*, 28(5): 860-869. <https://doi.org/10.1002/oby.22756> PMID: 32270927
9. Cienfuegos, S., Gabel, K., Kalam, F., Ezpeleta, M., Wiseman, E., Pavlou, V., Lin, S., Oliveira, M.L., Varady, K.A. (2020) Effects of 4- and 6-h Time-Restricted Feeding on Weight and Cardiometabolic Health: A Randomized Controlled Trial in Adults with Obesity. *Cell Metabolism*, 32(3): 366-378.e3. <https://doi.org/10.1016/j.cmet.2020.06.018> PMID: 32673591
10. Jamshed, H., Beyl, R.A., Della Manna, D.L., Yang, E.S., Ravussin, E., Peterson, C.M. (2019) Early Time-Restricted Feeding Improves 24-Hour Glucose Levels and Affects Markers of the Circadian Clock, Aging, and Autophagy in Humans. *Nutrients*, 11(6): 1234. <https://doi.org/10.3390/nu11061234>
11. Wilkinson, M.J., Manoogian, E.N.C., Zadourian, A., Lo, H., Fakhouri, S., Shoghi, A., Wang, X., Fleischer, J.G., Navlakha, S., Panda, S., Taub, P.R. (2020) Ten-Hour Time-Restricted Eating Reduces Weight, Blood Pressure, and Atherogenic Lipids in Patients with Metabolic Syndrome. *Cell Metabolism*, 31(1): 92-104.e5. <https://doi.org/10.1016/j.cmet.2019.11.004> PMID: 31813824
12. Maruthur, N.M., Pilla, S.J., White, K., Wu, B., Maw, M.T.T., Duan, D., Turkson-Ocran, R.A., Zhao, D., Charleston, J., Peterson, C.M., Dougherty, R.J., Schrack, J.A., Appel, L.J., Guallar, E., Clark, J.M. (2024) Effect of Isocaloric, Time-Restricted Eating on Body Weight in Adults With Obesity: A Randomized Controlled Trial. *Annals of Internal Medicine*, 177(5): 549-558. <https://doi.org/10.7326/M23-3132> PMID: 38639542
13. Sutton, E.F., Beyl, R., Early, K.S., Cefalu, W.T., Ravussin, E., Peterson, C.M. (2018) Early Time-Restricted Feeding

- Improves Insulin Sensitivity, Blood Pressure, and Oxidative Stress Even without Weight Loss in Men with Prediabetes. *Cell Metabolism*, 27(6): 1212-1221.e3. <https://doi.org/10.1016/j.cmet.2018.04.010> PMID: 29754952
14. Lowe, D.A., Wu, N., Rohdin-Bibby, L., Moore, A.H., Kelly, N., Liu, Y.E., Philip, E., Vittinghoff, E., Heymsfield, S.B., Olgin, J.E., Shepherd, J.A., Weiss, E.J. (2020) Effects of Time-Restricted Eating on Weight Loss and Other Metabolic Parameters in Women and Men With Overweight and Obesity: The TREAT Randomized Clinical Trial. *JAMA Internal Medicine*, 180(11): 1491-1499. <https://doi.org/10.1001/jamainternmed.2020.4153> PMID: 32986097
  15. Liu, D., Huang, Y., Huang, C., Yang, S., Wei, X., Zhang, P., Guo, D., Lin, J., Xu, B., Liu, C., He, H., Wu, X., Ma, L., Bai, R., Zhu, X., Sun, C., Xiang, J., Zheng, F., Xu, S., Chen, X., Liang, Y., Chen, M., Kumar, S., Yang, H., Guo, X. (2022) Calorie Restriction with or without Time-Restricted Eating in Weight Loss. *New England Journal of Medicine*, 386(16): 1495-1504. <https://doi.org/10.1056/NEJMoa2114833> PMID: 35443107
  16. Lin, S., Cienfuegos, S., Ezpeleta, M., Gabel, K., Pavlou, V., Mulas, A., Chakos, K., McStay, M., Wu, J., Tussing-Humphreys, L., Alexandria, S.J., Sanchez, J., Unterman, T., Varady, K.A. (2023) Time-Restricted Eating Without Calorie Counting for Weight Loss in a Racially Diverse Population: A Randomized Controlled Trial. *Annals of Internal Medicine*, 176(7): 885-895. <https://doi.org/10.7326/M23-0052> PMID: 37364268
  17. Moro, T., Tinsley, G., Bianco, A., Marcolin, G., Pacelli, Q.F., Battaglia, G., Palma, A., Gentil, P., Neri, M., Paoli, A. (2016) Effects of eight weeks of time-restricted feeding (16/8) on basal metabolism, maximal strength, body composition, inflammation, and cardiovascular risk factors in resistance-trained males. *Journal of Translational Medicine*, 14: 290. <https://doi.org/10.1186/s12967-016-1044-0> PMID: 27737674
  18. Liu, L., Chen, W., Wu, D., Hu, F. (2022) Metabolic Efficacy of Time-Restricted Eating in Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Journal of Clinical Endocrinology & Metabolism*, 107(12): 3428-3441. <https://doi.org/10.1210/clinem/dgac570> PMID: 36190980
  19. Anton, S.D., Moehl, K., Donahoo, W.T., Marosi, K., Lee, S.A., Mainous, A.G. 3rd, Leeuwenburgh, C., Mattson, M.P. (2018) Flipping the Metabolic Switch: Understanding and Applying the Health Benefits of Fasting. *Obesity*, 26(2): 254-268. <https://doi.org/10.1002/oby.22065> PMID: 29086496
  20. Manoogian, E.N.C., Chow, L.S., Taub, P.R., Laferrère, B., Panda, S. (2022) Time-restricted Eating for the Prevention and Management of Metabolic Diseases. *Endocrine Reviews*, 43(2): 405-436. <https://doi.org/10.1210/endrev/bnab027> PMID: 34550357
  21. Pellegrini, M., Cioffi, I., Evangelista, A., Ponzo, V., Goitre, I., Ciccone, G., Ghigo, E., Bo, S. (2020) Effects of time-restricted feeding on body weight and metabolism. A systematic review and meta-analysis. *Reviews in Endocrine and Metabolic Disorders*, 21(1): 17-33. <https://doi.org/10.1007/s11154-019-09524-w> PMID: 31808043
  22. Moon, S., Kang, J., Kim, S.H., Chung, H.S., Kim, Y.J., Yu, J.M., Cho, S.T., Oh, C.M., Kim, T. (2020) Beneficial Effects of Time-Restricted Eating on Metabolic Diseases: A Systemic Review and Meta-Analysis. *Nutrients*, 12(5): 1267. <https://doi.org/10.3390/nu12051267> PMID: 32365676
  23. Patikorn, C., Roubal, K., Veettil, S.K., Chandran, V., Pham, T., Lee, Y.Y., Giovannucci, E.L., Varady, K.A., Chaiyakunapruk, N. (2021) Intermittent Fasting and Obesity-Related Health Outcomes: An Umbrella Review of Meta-analyses of Randomized Clinical Trials. *JAMA Network Open*, 4(12): e2139558. <https://doi.org/10.1001/jamanetworkopen.2021.39558> PMID: 34919135
  24. Che, T., Yan, C., Tian, D., Zhang, X., Liu, X., Wu, Z. (2021)

Time-restricted feeding improves blood glucose and insulin sensitivity in overweight patients with type 2 diabetes: a randomised controlled trial. *Nutrition & Metabolism*, 18: 88. <https://doi.org/10.1186/s12986-021-00613-9> PMID: 34620199

25. Kesztyüs, D., Cermak, P., Gulich, M., Kesztyüs, T. (2019) Adherence to Time-Restricted Feeding and Impact on Abdominal Obesity in Primary Care Patients: Results of a Pilot Study in a Pre-Post Design. *Nutrients*, 11(12): 2854. <https://doi.org/10.3390/nu11122854>
26. Xie, Z., Sun, Y., Ye, Y., Hu, D., Zhang, H., He, Z., Zhao, H., Yang, H., Mao, Y. (2022) Randomized controlled trial for time-restricted eating in healthy volunteers without obesity. *Nature Communications*, 13: 1003. <https://doi.org/10.1038/s41467-022-28662-5>
27. Peeke, P.M., Greenway, F.L., Billes, S.K., Zhang, D., Fujioka, K. (2021) Effect of time restricted eating on body weight and fasting glucose in participants with obesity: results of a randomized, controlled, virtual clinical trial. *Nutrition & Diabetes*, 11: 6. <https://doi.org/10.1038/s41387-021-00149-0>