Supplementary Material

**Supplementary Table 1.** MEDLINE search strategy

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| **Conceptual groups** | **Search Terms** |
| **Children/adolescents (population)** | 1. adolescent/ or child/ or child, preschool/  2. (child or children).ti,ab,kf.  3. (girl or girls). ti,ab,kf.  4. (boy or boys).ti,ab,kf.  5. (adolesc\* or preadolsc\* or pre-adolesc\*).ti,ab,kf.  6. (teen\* or preteen\* pre-teen\*).ti,ab,kf.  7. (pubert\* or prepubert\* or pre-pubert\*).ti,ab,kf.  8. (pubesc\* or prepubesc\* or pre-pubesc\*).ti,ab,kf.  9. (youth or youths).ti,ab,kf.  10. (juvenile or juveniles).ti,ab,kf.  11. (p?ediatric or p?ediatrics).ti,ab,kf.  12. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 |
| **Type 1 diabetes (exposure)** | 1. Diabetes Mellitus, Type 1/ 2. (IDDM or T1DM or T1D or DM1).ti,ab,kf. 3. ((“insulin depend\*” or “insulin-depend\*” or “insulindepend\*).ti,ab,kf. 4. ((diabet\* or dm) adj3 (“type one” or “type 1” or “type I”)).ti,ab,kf. 5. ((juvenile or auto-immun\* or autoimmun\* or “sudden onset”) adj2 (diabet\* or DM)).ti,ab,kf. 6. 13 or 14 or 15 or 16 or 17 7. exp Diabetes Insipidus/ 8. diabet\* insipidus.ti,ab,kf. 9. 19 or 20 10. 18 not 21 |
| **Bone (outcomes)** | 23. exp Body Composition/  24. (body adj3 (composition or distribution)).ti,ab,kf.   1. ((fat or adipos\*) adj3 (volume or composition or distribution or mass or index or kg or kilogram or kilograms or total or total-body or whole or whole-body)).ti,ab,kf. 2. ((fat or adipos\*) adj3 (percentage or percent or “per cent” or %)).ti,ab,kf. 3. ((musc\* or lean or fat-free or “fat free”) adj3 (volume or composition or distribution or mass or index or kg or kilogram or kilograms or total or total-body or whole or whole-body)).ti,ab,kf. 4. ((musc\* or lean or fat-free or “fat free”) adj3 (percentage or percent or “per cent” or %)).ti,ab,kf. 5. ((android or gynoid or visceral or appendicular or abdominal or intra-abdominal) adj3 (fat or lean or muscle or mass or adipos\*)).ti,ab,kf. 6. 23 or 24 or 25 or 26 or 27 or 28 or 29 |
| **Combined** | 1. 12 and 22 and 30 2. Limit: English |

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R)

**Supplementary Table 2.** Inclusion/Exclusion criteria for study selection and excluded reports

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| Considered Items | Inclusion | Exclusion | Excluded Reports |
| Study Design | Cross-sectional studies or baseline from intervention or longitudinal studies compared with TDC | Follow-up or post-intervention data from intervention group in studies with interventions  Studies without compared to typically developing controls | No control groups (1–3) |
| Study population | Children and adolescents with diabetes mellitus, type 1 (mean or median age 18yrs) with (1) at least one year mean or median disease duration, and (2) no other conditions or medication potentially influencing body composition (e.g., hypertension) | Adults with diabetes mellitus, type 1 (mean or median age 18yrs)  Children and adolescents with diabetes mellitus, type 1 with less than one year mean or median disease duration  Children and adolescents with diabetes mellitus, type 1 with other conditions or medication potentially influencing body composition (e.g., hypertension) | Participants without T1D (4)  Adult participants with T1D (5) |
| Outcomes | At least one of body fat %, lean mass%, total body fat and lean mass measured by DXA | Outcomes measured by other technology (e.g., bioelectrical impedance, skinfold thickness)  No outcomes reported | Measured by bioelectrical impedance (6), and skinfold thickness (7)  Did not measure or report total body composition outcomes (8–15)  Did not measure or report total body composition outcomes for controls (16) |
| Publication date range | Up to Jun 20, 2021 |  |  |
| Language restriction | English only | Not English |  |
| Publication type | Original study with full text and peer reviewed | Non-original studies or without full text or peer review |  |
| Other | Human only | Animal study |  |

**Supplementary Table 3.** Newcastle-Ottawa quality assessment scale (adapted for cross sectional studies) (17)

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| **Categories** | **Questions** |
| **Selection**  (5 stars max) | 1. Representativeness of the sample:    1. Truly representative of the average in the target population. \* (all subjects or random sampling)    2. Somewhat representative of the average in the target population. \* (non-random sampling)    3. Selected group of users.    4. No description of the sampling strategy.   *Note: If participants with type 1 diabetes and were recruited from medical clinics, like diabetes clinics, option b) would be selected*   1. Sample size:    1. Justified and satisfactory. \*    2. Not justified. 2. Non-respondents:    1. Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. \*    2. The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.    3. No description of the response rate or the characteristics of the responders and the non-responders. 3. Ascertainment of the exposure (risk factor):    1. Validated measurement tool. \*\*    2. Non-validated measurement tool, but the tool is available or described.\*    3. No description of the measurement tool.   *Note: if diabetes were diagnosed with type 1 diabetes, option b) would be selected* |
| **Comparability** (2 stars max) | 1. The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.    1. The study controls for the most important factor (Body mass/BMI (18,19)). \*    2. The study control for any additional factor (e.g., sex, age, maturity, height (19–21)). \* |
| **Outcome**  (3 stars max) | 1. Assessment of the outcome:    1. Independent blind assessment. \*\*    2. Record linkage. (i.e., DXA-measured body composition) \*\*    3. Self report. \*    4. No description. 2. Statistical test:    1. The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (*p* value). \*    2. The statistical test is not appropriate, not described or incomplete   *Note: if body mass or BMI differed between groups, but not adjusted in statistical*  *analysis, it will be considered inappropriate statistical test, so option b) would be*  *selected* |

**Supplementary Table 4.** Includedstudy characteristics

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| **Reference** | **Design** | **T1D**  **Sample Size (Sexes)**  **Demographics**  Mean (SD) \* | **TDC**  **Sample Size (Sexes)**  **Demographics**  Mean (SD) \* | **Outcomes** | **T1D**  Mean (SD) \* | **TDC**  Mean (SD) \* | **Key Findings** |
| Abd El Dayem et al. (2011) Egypt(22) | Cross-sectional | N=47 (14M,33F) Age: 13.3yrs (3.37) Height (SDS): -0.7 (1.0) Body mass (SDS): -0.04 (1.3) BMI: 22.0kg/m2 (8.0) Disease duration: 6.3yrs (3.0) HbA1c: 8.8% (2.1)  Insulin dosage: 1.3 U/kg/day (0.5) | N=30 (12M, 18F) Age: 11.9yrs (2.98) BMI: 21.2kg/m2 (7.5) HbA1c: 5.6% (1.1) | Body fat % | 35.2 (8.5) | 22.5 (5.6) | 56% higher body fat % and 17% lower lean mass % in children with T1D |
| Lean mass % | 63.2 (8.6) | 76.1 (5.6) |
| Abd El Dayem & Battah (2012)  Egypt(23) | Cross-sectional | N=25 (no hypertension) Age: 13.5yrs (3.1) Height (SDS): -0.7 (1.0) Body mass (SDS): -0.0 (1.3) BMI: 20.1kg/m2 (3.1) BMI (Z-score): 0.8 (0.8) Disease duration: 6.8yrs (2.1) HbA1c: 8.4% (2.0)  Insulin dosage: 1.2 U/kg/day (0.3) | N=30 | Body fat % | 34.6 (8.7) | 22.5 (5.6) | Higher fat mass % in children with T1D (no hypertension) |
| Ansell et al. (2020) US (24) | Cross-sectional | N=15 (9M, 6F)  Age: 17.7yrs (1.7)  Height: 170.3cm (8.3)  Body mass: 67.3kg (8.6)  BMI: 23.2kg/m2 (2.0)  BMI percentile: 67 (20)  HbA1c: median 8.3% [IQR 7.2-8.9]  Disease duration: 6.9yrs (4.6) | N=28 (14M, 14F)  Age: 17.6yrs (1.7)  Height: 169.5cm (9.9)  Body mass: 60.2kg (8.6)  BMI: 20.9kg/m2 (1.7)  BMI percentile: 44 (21)  HbA1c: median 5.2% [IQR 4.8-5.6] | Body fat % | 23.0 (7.9) | 25.6 (8.7) | No difference in body fat %, fat and lean mass between children with T1D and TDC |
| Fat mass (kg) | 16.7 (5.8) | 13.4 (4.6) |
| Lean mass (kg) | 46.2 (8.7) | 43.7 (8.9) |
| Davis et al. (2012) † US(25) | Follow-up | N=30 (18M, 12F) Age: 10.5yrs (2.9) at baseline Height (SDS): 0.0 (1.0) Body mass (SDS): 0.1 (1.1) BMI (SDS): 0.2 (1.1) HbA1c:  M: 8.8% (1.2)  F: 7.8% (10)  Disease duration: 1yr  Insulin dosage: 0.9 U/kg/day (0.2) | N=14 (8M, 6F) Age: 10.0 (2.9) at baseline Height (SDS): 0.4 (1.5) Body mass (SDS): 0.1 (1.5) BMI (SDS): -0.2 (1.3) | Body fat % | 23.4 (5.8) | 24.4 (8.3) | No difference on body fat %, total body fat and lean mass between children with T1D at 1 year after diagnosis and TDC |
| Fat mass (kg) | 9.2 (3.2) | 10.0 (6.5) |
| Lean mass (kg) | 30.9 (9.9) | 29.6 (9.6) |
| Devaraja et al. (2020) UK (26) | Cross-sectional | N=22 (9M,13F) Age: 13.8yrs (1.2) Height: 160.6cm (9.4) Body mass: 58.1kg (14.6) BMI: 22.4kg/m2 (4.4) Disease duration: range from 2 months to 14.5yrs HbA1c: 62.4mmol (5.4) | 22 (9M,13F) Age: 13.6yrs (1.2) Height: 159.7cm (10.2) Body mass: 49.8kg (10.2) BMI: 19.3kg/m2 (2.5) | Body Fat % | 27.7 (7.1) | 25.0 (6.2) | 11-34% higher total body fat and lean mass in children with T1D; no difference on body fat % between children with T1D and TDC  No difference after adjusting for height and weight between children with T1D and TDC |
| Fat mass (kg) | 16.8 (7.4) | 12.6 (4.4) |
| Lean mass (kg) | 41.5 (8.3) | 37.3 (7.74) |
| Gusso et al. (2017) New Zealand(27) | Randomized controlled trial | T1D Intervention Group:  N=38 (20M, 18F)  Age: 15.6yrs (1.3)  Body mass: 69.8kg (95% CI 66.1–73.6)  BMI: 23.5kg/m2 (95% CI 22.4–24.7)  HbA1c: 8.8% (95% CI 8.4–9.3)  Disease duration: 5.4yrs (3.4)  T1D Control Group:  N=15 (7M, 8F)  Age: 15.5yrs (0.9)  Body mass: 69.2kg (95% CI 63.3–75.1)  BMI: 24.6kg/m2 (95% CI 22.8–26.4)  HbA1c: 8.6% (95% CI 7.8–9.3)  Disease duration: 7.5yrs (4.0) | N=22 (10M, 12F) Age: 16.7yrs (1.5) Body mass: 64.6kg (95% CI 59.5–69.7) BMI: 23.0kg/m2 (95% CI (21.4–24.5) HbA1c: 5.2% (95% CI (4.4–5.9) | Body Fat % | T1D Intervention  26.8 (8.6) | TDC Intervention  27.9 (8.9) | No difference on body fat % across T1D intervention, control groups and non-diabetic controls at baseline |
|  | T1D Control  27.3 (8.5) |  |
| Heap et al. (2004) US(28) | Cross-sectional | N=55 (30M,25F) Age: M: 14.6yrs (1.7) F: 14.7yrs (1.9) Height: M: 165.4cm (13.1) F: 161.8cm (8.2) Body mass:  M: 62.4 kg (17.0) F: 61.3 kg (17.8) BMI: M: 22.6 kg/m2 (4.7) F: 23.2 kg/m2 (5.2) Disease duration:  Tanner Stage II: 3.8yrs (3.7)  Tanner Stage III: 3.7yrs (3.0)  Tanner Stage IV: 5.8yrs (4.3)  Tanner Stage V: 6.7yrs (3.6)  Average HbA1c:  Tanner Stage II: 9.4% (2.6)  Tanner Stage III: 8.0% (0.7)  Tanner Stage IV: 9.0% (1.5)  Tanner Stage V: 9.0% (1.4)  Insulin dosage:  Tanner Stage II: 0.8 U/kg/day (0.3)  Tanner Stage III: 1.0 U/kg/day (0.2)  Tanner Stage IV: 1.0 U/kg/day (0.3)  Tanner Stage V: 0.9 U/kg/day (0.3) | N=95 (42M,53F) Age:  M: 14.5yrs (1.9) F: 14.8yrs (1.5) Height:  M: 166.8cm (12.2) F: 161.0cm (8.3) Body mass: M: 58.2 kg (13.7) F: 57.8 kg (15.7) BMI: M: 20.7 kg/m2 (3.2) F: 22.1 kg/m2 (4.9) | Body fat % | 23.8 (8.3) | 23.6 (8.5) | No difference on body fat % and total body lean mass between children with T1D and TDC |
| Lean mass (kg) | 42.1 (10.4) | 41.1 (10.9) |
| Ingberg et al. (2003); Sweden(29) | Cross-sectional | N=18 (18F) Age: 17.3yrs (0.6) Height: 166.0cm (7.0) Body mass: 72.6kg (8.4) BMI: 26.3kg/m2 (2.6) Disease duration: 9.3yrs (3.2) HbA1c: 8.0% (1.1)  Insulin dosage: 1.1 U/kg/day (0.3) | N=18 (18F) Age: 17.3yrs (0.6) Height: 170cm (6) Body mass: 65.8kg (12.5) BMI: 23.6kg/m2 (3.8) | Body Fat % | 37.1 (5.5) | 32.1 (7.7) | 16% higher body fat % and 24% higher total body fat mass in girls with T1D |
| Fat mass (kg) | 27.2 (6.5) | 21.9 (8.8) |
| Joseph et al. (2020)  US(30) | Cross-sectional | N=62 (62F) Age: 13.6yrs (1.7) Height (Z-score): 0.3 (1.1)Body mass (Z-score): 0.7 (0.8) BMI (Z-score): 0.7 (0.7) Diabetes duration: 4.8yrs (3.2) HbA1c: 8.6% (1.3)  Insulin dosage: 0.9 U/kg/day (0.2) | N=61 (61F) Age: 13.6yrs (1.9) Height (Z-score): 0.4 (0.9) Body mass (Z-score): 0.4 (0.9)BMI (Z-score): 0.3 (0.8) HbA1c: 5.4% (0.3) | Body fat % | 31.9 (5.7) | 31.7 (5.7) | No difference on body fat %, total body fat and lean mass between children with T1D and TDC |
| Fat mass (kg) | 18.4 (6.3) | 17.1 (5.7) |
| Lean mass (kg) | 36.5 (6.1) | 34.2 (6.8) |
| Karaguzel et al. (2006)  Turkey (31) | Cross-sectional | N=49 (26M,23F) Age: 11.3yrs (2.8) Body mass:  M: 38.4kg (10.9) F: 37.2kg (15.2) BMI: 17.9kg/m2 (3.0) Disease duration: M: 4.2yrs (3.1) F: 3.9yrs (3.0) Average HbA1c: HbA1c (<8%): N=18 HbA1C (>8%): N=31  Insulin dosage: 0.9 U/kg/day (0.3) | N=37 (20M,17F) Age: 11.0yrs (3.1) Body mass:  M: 42.5 (14.2) F: 37.2 (14.8) BMI: 18.2kg/m2 (3.0) | Lean mass (kg) | Male  28.0 (9.5) | 28.8 (13.0) | No difference on total body fat and lean mass between children with T1D and TDC |
|  | Female  21.6 (7.4) | 22.4 (8.5) |
| Fat mass (kg) | Male  9.0 (3.0)  Female  12.5 (6.4) | 9.0 (4.4)  12.8 (6.0) |
| Komatsu et al. (2005) Brazil(32) | Cross-sectional | N=72 (38M,34F) Age: median 16yrs (range 9-20) Height: 160cm (12) Body mass: 56.0kg (13.4) BMI: 21.5kg/m2 (3.7) Disease duration: 4.9yrs (3.6) HbA1c: 8.1% (2.2)  Insulin dosage: 1.0 U/kg/day (0.4) | N=46 (26M,20F) Age: median 16yrs (range 10-18) Height: 166cm (10) Body mass: 58.2kg (12.7) BMI: 20.8kg/m2 (2.8) HbA1c: 5.2% (0.9) | Body fat % | 22.4 (7.8) | 19.7 (7.2) | No difference on body fat %, total body fat and lean mass between children with T1D and TDC |
| Fat mass (kg) | 12.4 (5.0) | 11.6 (4.7) |
| Lean mass (kg) | 41.2 (10.0) | 45.0 (9.5) |
| Krishnan et al. (2011) US(33) | Cross-sectional | N=29  Normal Weight (N=14; 9M,5F)  Age: 15.9yrs (2.3)  Height: 162.5cm (23.7)  Body mass: 59.0kg (11.3)  BMI: 20.6kg/m2 (2.0)  BMI percentile: 50.7% (21.6)  Disease duration: >3yrs HbA1c: 8.8% (1.3)  Overweight (N=15; 10M,5F)  Age: 16.3yrs (2.2)  Height: 171.1cm (8.7)  Body mass: 84.3kg (17.6)  BMI: 28.5kg/m2 (3.6)  BMI percentile: 93.1% (4.2)  Disease duration: >3yrs  HbA1c: 8.2% (1.0) | N=37  Normal Weight (N=14; 6M,8F)  Age: 16.5yrs (2.6)  Height: 167.2cm (6.9)  Body mass: 57.4kg (7.5)  BMI: 20.5kg/m2 (1.5)  BMI percentile: 47.3% (17.1)  HbA1c: 5.1% (0.3)  Overweight (N=23; 13M,10F)  Age: 15.6yrs (2.1)  Height: 168.3cm (9.9)  Body mass: 93.7kg (19.9)  BMI: 32.9kg/m2 (5.6)  BMI percentile: 96.6% (3.2)  HbA1c: 5.4% (0.2) | Body fat % | Normal Weight | | No difference on body fat %, total body fat mass between children with T1D and TDC |
|  | 24.3 (1.7) | 21.4 (1.6) |
|  | Overweight  36.7 (2.7) | 36.5 (1.7) |
| Fat mass (kg) | Normal Weight | |
|  | 13.4 (1.1) | 11.3 (1.1) |
|  | Overweight  29.9 (4.2) | 36.2 (2.6) |
| Maggio et al. (2010) Switzerland(34) | Cross-sectional | N=27 (13M,14F) Age: 10.5yrs (2.4) Height: 141.8cm (15.1) Body mass: 38.3kg (12.0) BMI: 18.5kg/m2 (12.0) Disease duration: 3.2yrs (SE 12.0) HbA1c: 7.9% (3.6)  Insulin dosage: 0.8 U/kg/day (0.2) | N=32 (16M,16F) Age: 10.5yrs (2.5) Height: 143.1cm (15.8) Body mass: 37.3kg (13.0) BMI: 17.6kg/m2 (SE 2.6) HsbA1c: 5.4% (3.3) | Lean mass (kg) | 28.5 (9.9) | 27.7 (9.1) | No difference on total body lean mass between children with T1D and TDC |
| Moyer-Mileur et al. (2004) US(35) | Follow-up | N=42 (26M,16F) Age: M: 14.9yrs (1.8) F: 14.1yrs (1.8) Height:  M: 166cm (12) F: 161cm (7) Body mass: M: 62.1kg (23.8) F: 53.2kg (8.5) BMI: M: 23.4kg/m2 (6.9) F: 20.5kg/m2 (3.5) Disease duration: 4.2yrs (3.1) HbA1c: 8.2% (1.2)  Insulin dosage: 0.9 U/kg/day (0.3) | N=199 (90M,109F) Age: M: 15.0yrs (2.1) F: 15.1yrs (1.9) Height:  M: 168cm (12) F: 162cm (8) Body mass:  M: 59.8kg (17.1) F: 58.2kg (15.4) BMI: M: 21.0kg/m2 (4.6) F: 22.1kg/m2 (4.8) | Body Fat % | 22.3 (7.5) | 23.4 (8.6) | 3% higher total body lean mass  No difference on body fat % between children with T1D and TDC |
|  | Male  18.9 (6.1) | 18.1 (8.0) |
|  | Female  27.8 (6.4) | 27.7 (6.4) |
| Lean mass (kg) | 43.0 (5.8) | 41.6 (7.1) |
| Moyer-Mileur et al. (2008) US(36) | Cross-sectional | N=11 (11F) Age: 12.9yrs (1.0) Height (SDS): 0.1 (1.0) BMI: 20.9kg/m2 (1.9) Disease duration: 5.9yrs (3.7) HbA1c: 8.1% (1.0)  Insulin dosage: 1.0 U/kg/day (0.2) | N=10 (10F) Age: 13.1yrs (1.1) Height (SDS): 0.2 (0.6) BMI: 20.3kg/m2 (2.1) HbA1c: 4.9% (0.3) | Body Fat %  Lean mass (kg) | 29.8 (6.3)  33.4 (5.4) | 29.1 (7.0)  33.5 (5.4) | No difference on body fat % and total body lean mass between children with T1D and TDC |
|  |  |  |
| Nadeau et al. (2010) *US* (37) | Cross-sectional | N=12 (6M,6F) Age: 14.8yrs (2.6) BMI: 20.9 kg/m² (3.1) Disease duration: 7.5yrs (4)  HbA1c: 8.7% (1.6) | N=12 (6M,6F) Age: 15.6yrs (1.8) BMI: 21.0 kg/m² (2.4) HbA1c: 4.9% (0.3) | Body fat % | 22.0 (6.6) | 20.4 (10.6) | No difference on body fat % and lean mass %, total body fat and lean mass between children with T1D and TDC |
| Fat mass (kg) | 13.4 (5.9) | 11.01 (6.4) |
| Lean mass % | 77.3 (6.6) | 79.4 (10.6) |
| Lean mass (kg) | 42.4 (6.5) | 44.8 (8.4) |
| Parthasarathy et al. (2016) India (38) | Follow-up | N=80 (39M, 41F) Age: 10.7yrs (3.4) Height: 132.3cm (18.1) Height (Z-score): –0.9 (1.1) Body mass: 28.9kg (11.8) Body mass (Z-score): –1 (0.9) BMI: 15.6kg/m2 (3.1) BMI (Z-score): –0.7 (0.8) HbA1c: 10% (2) | N=54 Age: 11.7yrs (2.8) Height: 144.7cm (15.2) Height (Z-score): 0 (0.9) Body mass: 35.0kg (11.2) Body mass (Z-score): –0.8 (3.4) BMI: 17.1kg/m2 (5.8) BMI (Z-score): –1.3 (5.7) | Body fat % | 20.3 (9.1) | 26.5 (12) | 23% less body fat % in children with T1D  No difference on lean mass % |
| Lean mass % | 73.9 (9.0) | 70.7 (9.0) |
| Saki et al. (2017) Iran(39) | Cross-sectional | N=87 (39M,48F) Age: 12.4yrs (4.2) Height: 146.2cm (20.1) Body mass: 39.7kg (15.3) BMI: 17.8kg/m2 (3.2) Disease duration: 4.4yrs (2.8) HbA1c: 10.2% (2.2)  Insulin dose: 0.7 U/kg/day (0.3) | N=87 (39M,48F) Age: 12.4yrs (4.2) Height: 151.1cm (16.4) Body mass: 41.3kg (13.8) BMI: 17.5kg/m2 (3) | Body fat % | 28.4 (5.8) | 23.4 (8.1) | 21% higher body fat % and 14% lower total body lean mass in children with T1D  No difference on total body fat mass between children with T1D and TDC |
| Fat mass (kg) | 11.0 (5.1) | 9.9 (5.1) |
| Lean mass (kg) | 26.3 (10.3) | 30.5 (10.3) |
| Santiprabhob et al. (2021)  Thailand (40) | Cross-sectional | N=100 (44M,56F)  Age: 14.5yr (2.7)  Height: 156.3cm (11.2)  Height (Z-score): 0.17 (1.2)  Body mass: 52.7kg (14.6)  Body mass (Z-score): 1.1 (1.7)  BMI: 21.2kg/m2 (4.0)  BMI (Z-score): 0.4 (1.1)  Disease duration: median 5.8yre [IQR 3.0-9.1]  HbA1c: 8.9% (1.8)  Insulin dosage: 1.2 U/kg/day (0.3) | N=100 (44M,56F)  Age: 14.3yr (2.7)  Height: 158.4cm (11.7)  Height (Z-score): 0.7 (1.2)  Body mass: 54.1kg (15.0)  Body mass (Z-score): 1.4 (1.8)  BMI: 21.2kg/m2 (4.1)  BMI (Z-score): 0.4 (1.1)  HbA1c: 5.2% (0.3) | Lean mass (kg) | 34.5 (9.2) | 35.0 (9.4) | No difference on total body lean mass between children with T1D and TDC |
| Sarnblad et al. (2006) Sweden(41) | Follow-up (baseline) | N=23 (23F) Age: 15.7yrs (2.1) Height: 163.8cm (7.9) Body mass: median 65.3kg [IQR 16.0] BMI: median 23.6kg/m2 [IQR 2.6] BMI (SDS): 0.8 (0.8) Disease duration: median 6.0yrs [IQR 7.7] HbA1c: 7.6% (1.4)  Insulin dosage: 1.1 U/kg/day (0.3) | N=19 (19F) Age: 15.6yrs (1.9) Height: 164.3cm (6.9) Body mass: median 57.2kg [IQR 24.1] BMI: median 20.5kg/m2 [IQR 8.0] BMI (SDS): 0.7 (1.2) | Body fat % | 32.6 (8.3) | 31.0 (9.9) | No difference on body fat %, total body fat and lean mass between children with T1D and TDC |
| Fat mass (kg) | 20.7 (7.6) | 20.0 (10.0) |
| Sarnblad et al. (2016) Sweden(42) | Cross-sectional | N=44 (44F) Age: 16.4yrs (1.9) Height: 165cm (7) Body mass: 66.7kg (11.0) BMI: 24.5kg/m2 (3.3) HbA1c: 70.1mmol/mol (13.2)  Insulin dose: 1.1 U/kg/day (0.3) | N=49 (49F) Age: 16.8yrs (1.7) Height: 166cm (6) Body mass: 64.3kg (11.9) BMI: 23.1kg (3.7) | Body fat % | 34.9 (7.6) | 32.2 (8.3) | No difference on body fat % between children with T1D and TDC |
| Vinovskis et al. (2020) US(43) | Cross-sectional | N=50 (25M,25F) Age: 16.0yrs (3.0) Body mass: 67.5kg (17.6) BMI: 23.4kg/m2 (5.1) Disease duration: 5.7yrs (2.6) HbA1c: 8.7% (1.3) | N=20 (6M,14F) Age: 16.1yrs (2.9) Body mass: 62.7kg (14.5) BMI: 22.7kg/m2 (3.7) HbA1c: 5.2% (0.2) | Fat mass (kg) | 20.3 (9.4) | 19.2 (6.7) | No difference on total body fat mass between children with T1D and TDC |
| Whalley et al. (2009)  New Zealand(44) | Cross-sectional | N=11 (11F)  Age: 15.5yrs (1.1)  Height: 163cm (6)  Body mass: 65.0kg (9.89)  BMI: 24.5kg/m2 (3.6)  Disease duration: median 66 months [IQR 13-128]  HbA1c: 8.7% (1.0) | N=9 (9F)  Age: 14.9yrs (1.182)  Height: 167cm (7)  Body mass: 58.1kg (7.9)  BMI: 20.8kg/m2 (2.0)  HbA1c: 5.1% (0.21) | Body fat % | 35.9 (7.8) | 28.1 (5.7) | 28% higher body fat % in children with T1D |
| Wu et al. (2021) China (45) | Cross-sectional | N=48 (18M,30F)  Age: 14.0yrs (2.9)  Height: 160cm (13)  Body mass: 49.9kg (12.6)  BMI: 19.0kg/m2 (3.1)  BMI (Z-score): -0.3 (1.2)  Disease duration: 3.6yrs (2.3)  HbA1c: 61mmol/mol (9) or 7.7% (2.5)  Insulin dosage: 0.9 U/kg/day (0.3) | N=19 (9M,11F)  Age: 13.6yrs (3.5)  Height: 159cm (13)  Body mass: 52.3kg (15.5)  BMI: 20.4kg/m2 (3.3)  BMI (Z-score): 0.5 (1.0) | Body fat % | 29.3 (9.5) | 28.4 (6.6) | No difference on total body fat % between children with T1D and TDC |

Abbreviations: BMI: body mass index; CI: confidence interval; HbA1c: Hemoglobin A1c; IQR: interquartile range; SD: standard deviation; SDS: standard deviation score; SE: standard error; T1D: type 1 diabetes mellitus; TDC: typically developing children; U/kg/day: unit per kilogram per day.

\*Median, interquartile range, range, standard error, least square mean, and n specified below if mean (SD) not reported and n was specific to the results.

†Study characteristics and key findings shown at 1-year follow-up (disease duration = 1 year), since baseline was measured at diagnosis

**Supplementary Table 5.** Risk of bias assessment based on quality assessment from modified Newcastle-Ottawa Scale (17). Good and fair study quality translate to low and moderate risk of bias, respectively

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Selection  (0-5 stars)\* | Comparability  (0-2 stars) | Outcomes  (0-3 stars) | Overall  (0-9 stars)\* | Quality |
| Abd El Dayem et al. (2011) (22) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Abd El Dayem & Battah (2012) (23) | \*\*\* |  | \*\* | 5 | Fair |
| Ansell et al. (2020) (24) | \*\*\* |  | \*\*\* | 6 | Fair |
| Davis et al. (2012) (25) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Devaraja et al. (2020) (26) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Gusso et al. (2017) (27) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Heap et al. (2004) (28) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Ingberg et al. (2003) (29) | \*\*\* |  | \*\* | 5 | Fair |
| Joseph et al. (2020) (30) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Karaguzel et al. (2006) (31) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Komatsu et al. (2005) (32) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Krishnan et al. (2011) (33) | \*\*\* | \* | \*\*\* | 7 | Good |
| Maggio et al. (2010) (34) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Moyer-Mileur et al. (2004) (35) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Moyer-Mileur et al. (2008) (36) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Nadeau et al. (2010) (37) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Parthasarathy et al. (2016) (38) | \*\*\* |  | \*\* | 5 | Fair |
| Saki et al. (2017) (39) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Santiprabhob et al. (2021) (40) | \*\*\*\* | \* | \*\* | 8 | Good |
| Sarnblad et al. (2006) (41) | \*\*\* |  | \*\*\* | 6 | Fair |
| Sarnblad et al. (2016) (42) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Vinovskis et al. (2020) (43) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Whalley et al. (2009) (44) | \*\*\* | \*\* | \*\*\* | 8 | Good |
| Wu et al. (2021) (45) | \*\*\* | \* | \*\*\* | 7 | Good |

\*The highest possible score is 9, since question 3 in “Selection” section (non-respondents) was not applicable for all studies.

**Supplementary Table 6.** Meta-regression results correlating potential explanatory factors to the difference in means of body fat %

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Studies** | **Unstandardized** | **95% Confidence Interval** | ***p*-value** |
| Sex (female ratio) | 18 | 4.7 | -3.7, 13.2 | 0.272 |
| Age | 17 | 0.3 | -1.0, 1.6 | 0.656 |
| Height | 13 | 0.1 | -0.2, 0.3 | 0.276 |
| Body Mass | 12 | 0.1 | -0.1, 0.3 | 0.277 |
| BMI | 16 | 0.5 | -0.6, 1.5 | 0.399 |
| HbA1c | 18 | -0.5 | -3.8, 2.9 | 0.784 |
| Age of onset | 12 | -2.3 | -3.5, -1.0 | <0.001 |
| Disease duration | 13 | 1.3 | -0.2, 2.7 | 0.085 |
| Insulin dose | 13 | 18.1 | 3.5, 32.6 | 0.015 |

**(A)** Lean mass (kg)Table

Description automatically generated

**(B)** Lean mass %

**Table

Description automatically generated**

**Supplementary Figure 1.** Forest plots of total body **(A)** lean mass (kg), and **(B)** lean mass (%)

**(A)** Fat mass (kg)Chart, scatter chart

Description automatically generated

**(B)** Body fat %

Polygon

Description automatically generated with low confidence

**(C)** Lean mass (kg)Chart, scatter chart

Description automatically generated

**(D)** Lean mass (%)

Shape

Description automatically generated

**Supplementary Figure 2.** Re-displayed funnel plots for **(A)** fat mass (kg), **(B)** body fat %, **(C)** lean mass (kg), and **(D)** lean mass % after Duval and Tweedie’s Trim and Fill adjustment

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