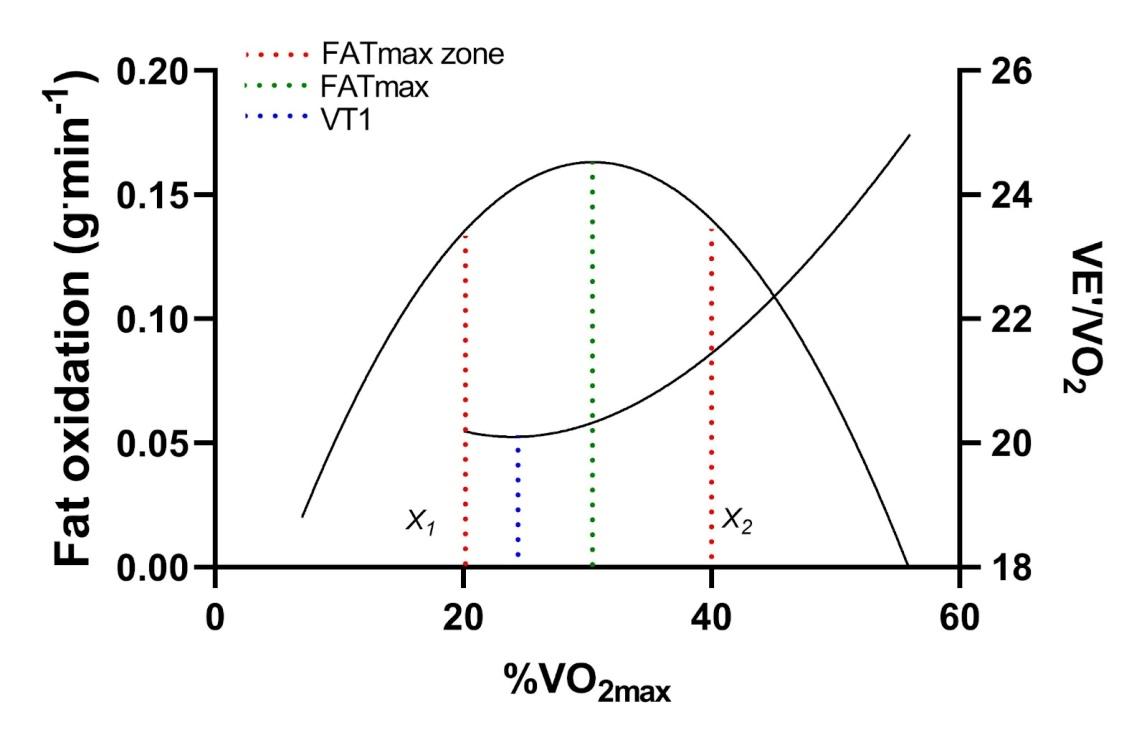
**Appendix A: FATmax ZONE**

FATmax zone was estimated using a meta-analytical approach by computing the distance, in terms of VO2, between the Upper (X2) and Lower (X1) FATmax zone range (Appendix A, Figure 1), which correspond to the acceptable range (to be divide equally in both sides of the FATmax) in which the differences between FATmax and AeT can fall and be considered within the FATmax zone.



**Appendix A; Figure 1.** Fat oxidation and ventilatory equivalents of oxygen during a graded exercise test performed on a treadmill. The FATmax (green dotted line) and the FATmax zone (between red dotted lines) were determined by fitting a cubic polynomial regression using the fat oxidation rate and the relative oxygen uptake at each stage of a test performed by a representative individual. In addition, the aerobic threshold (blue) was defined as the exercise intensity at which the ventilatory equivalents of oxygen breaks with linearity and showed a sustained increment. Lower (X1) and upper (X2) FATmax zone range.

Six articles (Appendix A, Figure 2) reporting the FATmax zone in trained (n=52) and untrained (n=70) individuals were identified from a total of 20 studies that performed a mathematical modelling of the fat oxidation kinetics [1]. The FATmax zone range was calculated using Metafor package of R software (version 4.0.4) (The R Foundation, Vienna, Austria) by computing the mean difference (MD) between the Upper (X1) (mean ± SD) and Lower (X2) FATmax zone intensity range (mean ± SD) of each study. Additionally, since Upper and Lower FATmax zone intensities were paired data deriving from the same individual, the correlation between the two exercise intensities was accounted for MD calculation. Specifically, the correlation coefficient between Upper and Lower FATmax zone intensities was estimated to be 0.96 for the included studies in the meta-analysis. When MDs were expressed in %VO2max, they were clustered in two studies; hence, a multilevel meta-analysis was performed to account for both the within-studies and between-studies variance [40,47]. Summary MD and *r* estimates were determined using a random-effects model and presented as mean and 95% confidence (CI) and prediction (PI) interval [40] (see Appendix A, Figure 2).



**Appendix A; Figure 2.** Forest plots of the mean change (e.g., difference between Upper and Lower FATmax zone limits) in the VO2 (expressed as ml/kg/min (a panel) and %VO2max (b panel)). The mean change corresponds to the exercise intensity range with fat oxidation higher than 90% of FATmax which has to be divided equally in both sides of the FATmax.

*NOTE*: Achten and Jeukendrup, 2002a (moderately trained cyclist); Emerenzianni et al. 2019e (women with obesity class I), Emerenzianni et al. 2019f (women with obesity class II), and Emerenzianni et al. 2019g (women with obesity class III); Gonzalez-Haro et al. 2007a (male triathletes), Gonzalez-Haro et al. 2007b (female triathletes), Gonzalez-Haro et al. 2007c (road cyclist) and Gonzalez-Haro et al. 2007d (male mountain bikers).

**Appendix B: AGREEMENT INDICATORS**

*Table 1.1: Estimation of 95% Limits of Agreement by subgroup for ml/min/kg method*

| Subgroup | Subset | Studies | Sample | N | Bias | sd\_bias | LOA\_L | LOA\_U | CI\_L | CI\_U |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Male | 7 | 9 | 326 | -2.07 | 4.02 | -9.96 | 5.82 | -15.04 | 10.90 |
| Gender | Female | 3 | 4 | 186 | -0.55 | 3.50 | -7.42 | 6.31 | -21.82 | 20.72 |
| Physical level | Active | 5 | 7 | 257 | -2.28 | 6.15 | -14.33 | 9.77 | -22.68 | 18.12 |
| Physical level | Inactive | 5 | 6 | 255 | -0.72 | 1.98 | -4.60 | 3.15 | -8.76 | 7.31 |
| Ergometer | Cycle | 6 | 8 | 348 | -2.48 | 6.00 | -14.24 | 9.28 | -20.16 | 15.20 |
| Ergometer | Treadmill | 4 | 5 | 164 | -0.21 | 1.53 | -3.21 | 2.79 | -6.29 | 5.87 |
| AeT method | Lactate | 5 | 7 | 322 | -1.88 | 5.61 | -12.87 | 9.11 | -20.55 | 16.79 |
| AeT method | Gas analysis | 6 | 6 | 190 | -1.33 | 3.08 | -7.37 | 4.71 | -11.76 | 9.10 |
| FAT max method | Visual | 7 | 10 | 416 | -1.00 | 3.80 | -8.44 | 6.45 | -14.14 | 12.14 |
| FATmax max method | Mathematical | 3 | 3 | 96 | -2.58 | 4.27 | -10.94 | 5.78 | -24.75 | 19.58 |
| VO2max protocol | Short | 10 | 11 | 434 | -1.85 | 3.75 | -9.19 | 5.49 | -12.83 | 9.13 |
| VO2max protocol | Long | 2 | 2 | 78 | 5.06 | 9.82 | -14.19 | 24.31 | -89.00 | 99.13 |
| FATmax protocol | Identical | 9 | 12 | 490 | -0.85 | 3.27 | -7.25 | 5.56 | -11.23 | 9.54 |
| FATmax protocol | Additional | 1 | 1 | 22 | -6.70 | 4.08 | -14.70 | 1.30 |  |  |
| All Studies | ml/min/kg | 10 | 13 | 512 | -1.49 | 3.89 | -9.12 | 6.14 | -12.89 | 9.90 |
| All Studies | ml/min/kg (w/o outliers) | 10 | 11 | 434 | -1.85 | 3.75 | -9.19 | 5.49 | -12.83 | 9.13 |

*Table 1.2: Estimation of 95% Limits of Agreement by subgroup for %VO2max method*

| Subgroup | Subset | Studies | Sample | N | Bias | sd\_bias | LOA\_L | LOA\_U | CI\_L | CI\_U |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Male | 9 | 10 | 368 | -5.87 | 9.91 | -25.28 | 13.55 | -35.09 | 23.35 |
| Gender | Female | 2 | 2 | 195 | -8.70 | 13.90 | -35.95 | 18.55 | -164.15 | 146.74 |
| Physical level | Active | 6 | 6 | 156 | -5.31 | 10.30 | -25.50 | 14.88 | -37.30 | 26.68 |
| Physical level | Inactive | 5 | 6 | 407 | -7.58 | 10.49 | -28.14 | 12.99 | -46.03 | 30.88 |
| Ergometer | Cycle | 5 | 5 | 99 | -6.83 | 10.63 | -27.66 | 14.00 | -41.92 | 28.27 |
| Ergometer | Treadmill | 6 | 7 | 464 | -6.04 | 10.44 | -26.50 | 14.42 | -41.11 | 29.03 |
| AeT method | Lactate | 4 | 4 | 73 | -6.95 | 10.60 | -27.72 | 13.83 | -46.67 | 32.78 |
| AeT method | Gas analysis | 8 | 8 | 490 | -6.14 | 9.83 | -25.41 | 13.12 | -36.19 | 23.90 |
| FAT max method | Visual | 6 | 7 | 445 | -5.29 | 10.73 | -26.33 | 15.75 | -41.52 | 30.94 |
| FATmax max method | Mathematical | 5 | 5 | 118 | -7.62 | 10.12 | -27.45 | 12.21 | -39.07 | 23.82 |
| VO2max protocol | Short | 9 | 10 | 541 | -5.15 | 9.96 | -24.67 | 14.37 | -34.25 | 23.95 |
| VO2max protocol | Long | 2 | 2 | 22 | -12.10 | 10.47 | -32.62 | 8.41 | -165.00 | 140.80 |
| FATmax protocol | Identical | 10 | 11 | 541 | -5.92 | 10.28 | -26.06 | 14.23 | -35.40 | 23.57 |
| FATmax protocol | Additional | 1 | 1 | 22 | -11.30 | 8.78 | -28.50 | 5.90 |  |  |
| All Studies | %VO2max | 11 | 12 | 563 | -6.39 | 10.24 | -26.47 | 13.69 | -35.03 | 22.25 |
| All Studies | %VO2max (w/o outliers) | 10 | 11 | 406 | -5.12 | 9.21 | -23.18 | 12.94 | -31.30 | 21.06 |

**Appendix C: SENSITIVITY ANALYSIS**

*Table 1.1: Estimation of 95% Limits of Agreement by subgroup for ml/min/kg method*

| Subgroup | Subset | Studies | Sample | N | Bias | sd\_bias | LOA\_L | LOA\_U | CI\_L | CI\_U |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Male | 7 | 9 | 326 | -1.57 | 3.67 | -8.76 | 5.61 | -13.63 | 10.48 |
| Gender | Female | 3 | 4 | 186 | -0.58 | 3.49 | -7.43 | 6.27 | -21.91 | 20.74 |
| Physical level | Active | 5 | 7 | 257 | -1.57 | 5.73 | -12.80 | 9.66 | -20.70 | 17.57 |
| Physical level | Inactive | 5 | 6 | 255 | -0.85 | 2.01 | -4.78 | 3.09 | -8.90 | 7.21 |
| Ergometer | Cycle | 6 | 8 | 348 | -1.90 | 5.72 | -13.11 | 9.31 | -18.75 | 14.95 |
| Ergometer | Treadmill | 4 | 5 | 164 | -0.31 | 1.63 | -3.51 | 2.88 | -6.65 | 6.02 |
| AeT method | Lactate | 5 | 7 | 322 | -1.41 | 5.18 | -11.57 | 8.76 | -19.26 | 16.45 |
| AeT method | Gas analysis | 6 | 6 | 190 | -1.33 | 3.08 | -7.37 | 4.71 | -11.76 | 9.10 |
| FAT max method | Visual | 7 | 10 | 416 | -0.64 | 3.41 | -7.32 | 6.05 | -13.28 | 12.01 |
| FATmax max method | Mathematical | 3 | 3 | 96 | -2.58 | 4.27 | -10.94 | 5.78 | -24.75 | 19.58 |
| VO2max protocol | Short | 10 | 11 | 434 | -1.89 | 3.74 | -9.22 | 5.43 | -12.85 | 9.07 |
| VO2max protocol | Long | 2 | 2 | 78 | 5.06 | 9.82 | -14.19 | 24.31 | -89.00 | 99.13 |
| FATmax protocol | Identical | 9 | 12 | 490 | -0.61 | 3.05 | -6.59 | 5.37 | -10.68 | 9.46 |
| FATmax protocol | Additional | 1 | 1 | 22 | -6.70 | 4.08 | -14.70 | 1.30 |  |  |
| All Studies | ml/min/kg | 10 | 13 | 512 | -1.20 | 3.59 | -8.24 | 5.84 | -11.92 | 9.52 |
| All Studies | ml/min/kg (w/o outliers) | 10 | 11 | 434 | -1.89 | 3.74 | -9.22 | 5.43 | -12.85 | 9.07 |

*Table 1.2: Estimation of 95% Limits of Agreement by subgroup for %VO2max method*

| Subgroup | Subset | Studies | Sample | N | Bias | sd\_bias | LOA\_L | LOA\_U | CI\_L | CI\_U |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Male | 9 | 10 | 368 | -6.02 | 9.86 | -25.33 | 13.30 | -35.08 | 23.04 |
| Gender | Female | 2 | 2 | 195 | -8.70 | 13.90 | -35.95 | 18.55 | -164.15 | 146.74 |
| Physical level | Active | 6 | 6 | 156 | -5.31 | 10.30 | -25.50 | 14.88 | -37.30 | 26.68 |
| Physical level | Inactive | 5 | 6 | 407 | -7.84 | 10.34 | -28.11 | 12.44 | -45.77 | 30.09 |
| Ergometer | Cycle | 5 | 5 | 99 | -6.83 | 10.63 | -27.66 | 14.00 | -41.92 | 28.27 |
| Ergometer | Treadmill | 6 | 7 | 464 | -6.26 | 10.36 | -26.56 | 14.05 | -41.04 | 28.53 |
| AeT method | Lactate | 4 | 4 | 73 | -6.95 | 10.60 | -27.72 | 13.83 | -46.67 | 32.78 |
| AeT method | Gas analysis | 8 | 8 | 490 | -6.14 | 9.83 | -25.41 | 13.12 | -36.19 | 23.90 |
| FAT max method | Visual | 6 | 7 | 445 | -5.51 | 10.67 | -26.43 | 15.41 | -41.52 | 30.51 |
| FATmax max method | Mathematical | 5 | 5 | 118 | -7.62 | 10.12 | -27.45 | 12.21 | -39.07 | 23.82 |
| VO2max protocol | Short | 9 | 10 | 541 | -5.30 | 9.92 | -24.74 | 14.14 | -34.27 | 23.68 |
| VO2max protocol | Long | 2 | 2 | 22 | -12.10 | 10.47 | -32.62 | 8.41 | -165.00 | 140.80 |
| FATmax protocol | Identical | 10 | 11 | 541 | -6.05 | 10.23 | -26.11 | 14.01 | -35.40 | 23.29 |
| FATmax protocol | Additional | 1 | 1 | 22 | -11.30 | 8.78 | -28.50 | 5.90 |  |  |
| All Studies | %VO2max | 11 | 12 | 563 | -6.51 | 10.20 | -26.50 | 13.47 | -35.01 | 21.98 |
| All Studies | %VO2max (w/o outliers) | 10 | 11 | 406 | -5.25 | 9.18 | -23.24 | 12.74 | -31.32 | 20.81 |