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Thèse préparée sous la direction de la Professeure Nadia Elia, MD, MSc.

" Bénéfice de l'hypnose en anesthésie : une revue systématique avec méta-analyse"

Thèse
présentée à la Faculté de Médecine
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par

Marie José LAHOUD

de
Amchit, LIBAN

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Thèse de :

Marie José LAHOUD
originaire de Amchit, Liban

Intitulée :

Bénéfice de l'hypnose en anesthésie : une revue systématique avec méta-analyse

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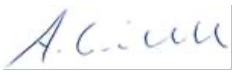

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Table des matières

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Je remercie mes parents qui comme dans tous mes projets de vie, m'ont encouragée avec grande fierté. Merci de me réconforter et de me rappeler l'importance de persévérer.

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[L'intelligence artificielle a été utilisée ponctuellement pour la mise en forme de certaines phrases de l'introduction uniquement.]

Présentation

Cette thèse est basée sur l'article: Lahoud MJ, Gurary ST, Elia N. Hypnosis for anaesthetists: a systematic review with meta-analyses; *Anaesthesia*, Accepted in July 2025.

Les chapitres 4 à 6 sont issus de cet article et sont rédigés en anglais.

Les résultats préliminaires de ce travail ont fait l'objet de présentation par poster lors du congrès de l'European Society of Anaesthesiology and Intensive Care (ESAIC) du 25 au 27 mai 2025 à Lisbonne, Portugal (Numéro : 10AP02-4).

Déclaration de conflits d'intérêt

J'ai suivi une formation en hypnose appliquée à l'anesthésie en 2016 à l'Université Paris-Saclay, Paris, France et je suis praticienne et tutrice en hypnose clinique au sein du département de médecine aigüe des Hôpitaux Universitaires de Genève depuis 2018. Ma formation et mon expérience ont pu influencer l'approche de la thématique.

Résumé

L’impact de l’hypnose en anesthésie est peu clair. Nous avons sélectionné toutes les études publiées pourtant sur l’hypnose administrée en présence d’un anesthésiste. Notre critère de jugement principal était la consommation d'hypnoanalgésiques durant l’intervention. Les critères secondaires comprenaient la douleur, l’anxiété et les effets indésirables. Nous avons identifié 142 études (59 essais randomisés contrôlés, 33 études randomisées non contrôlées, 22 cohortes sans comparateur, 28 cas cliniques). En se basant sur les essais randomisés, nous avons montré que l’hypnose administrée avant l’opération réduisait la douleur et l'anxiété postopératoire. L’hypnose administrée pendant l’intervention réduisait la douleur pendant l’intervention, sans effet en postopératoire, et diminuait l’anxiété postopératoire ainsi que le risque de nausées et vomissements. Nous n’avons rien pu conclure sur l’impact de l’hypnose réalisée après l’intervention, par manque de données. Si l'hypnose semble pouvoir améliorer certains aspects de la prise en charge anesthésique, son impact sur d’autres critères doit encore être clarifié.

1. Prologue

Tout le long de ma carrière médicale, soulager la douleur et l'anxiété des patients a toujours été l'objectif principal de ma pratique. C'est d'ailleurs la raison pour laquelle j'ai choisi l'anesthésie comme spécialité. Après avoir maîtrisé de nombreuses techniques et moyens médicamenteux de prise en charge de la douleur, j'ai cherché à m'approprier davantage d'autres outils mis à notre disposition, avec le regard non plus d'anesthésiste mais de soignant dans toute sa dimension. Par conséquent, le patient ne doit pas être perçu comme une juxtaposition d'organes ou une pathologie, mais comme une entité riche et complexe qu'il convient de prendre en charge dans sa globalité. Et c'est avec émerveillement que je me suis alors investie dans l'hypnose.

"Lorsque vous lui ouvrez la porte, la magie est partout."

Olivier Lockert*

*Hypnothérapeute depuis 1986, enseignant en Hypnose Ericksonienne, créateur avec Patricia d'Angeli de l'IFHE (Institut Français d'Hypnose Ericksonienne), auteur de nombreux articles et d'une douzaine d'ouvrages sur l'hypnose.

2. Introduction

2.1 Histoire de l'hypnose

Les premières utilisations médicales de l'hypnose remontent au XVIIIe siècle, avec Franz Anton Mesmer (1734-1815), médecin autrichien **(Image 1)**. A cette époque, le mot hypnose n'existe pas encore, on parle de "magnétisme animal", une théorie selon laquelle un fluide invisible et universel circulerait dans tous les êtres vivants. Mesmer avance que ce fluide, transmis par le thérapeute, permettrait de guérir l'organisme humain. Pour favoriser cette circulation, il conçoit un grand baquet à aimants, dans lequel plusieurs personnes plaçaient leurs mains à l'aide de tiges métalliques. Les séances donnaient lieu à des réactions spectaculaires, les "crises magnétiques". Il organise à Paris des séances de cérémonie du baquet; une sorte de transe collective accompagnée de rituels d'aimants et de baguettes **(Images 2, 3)** [1]. Ces pratiques sont rapidement écartées par les scientifiques de l'époque qui attribuent l'amélioration de l'état des patients à un effet de l'imagination. Cependant, leur impact historique est tel que Mesmer est aujourd'hui considéré comme l'un des pionniers de l'hypnose — d'où le terme « mesmerization », resté dans le langage courant anglo-saxon pour parler de l'hypnose.

Image 1: Estampe de Franz Anton Mesmer conservée au musée de la Révolution française-Vizille. Source: Musée de la Révolution Française. Auteur: Pujos/ Legrand. Disponible sur Wikimedia Commons : https://commons.wikimedia.org/wiki/File:Franz_Anton_Mesmer,_MRF_-_Vizille.jpg sous licence CC BY-SA 4.0

Image 2: Baquet de Mesmer. Musée de l'Histoire de la Médecine et de la Pharmacie, Université Claude Bernard Lyon 1. Photo originale envoyée par Mme Alexandra Narbonnet, chargée de l'action culturelle du Musée d'histoire de la médecine et de la pharmacie, Lyon, France.

Image 3: Patients à Paris recevant la thérapie du magnétisme animal de Mesmer. Gravure colorée d'après C.-L. Desrais. Sous licence Creative commons Attribution 4.0 International (CC BY 4.0). Source : Wellcome Collection.

En 1842, le chirurgien écossais James Braid introduit le concept de "neuro-hypnotism" (d'après le grec hupnos qui signifie sommeil), orientant vers une explication physiologique de l'état hypnotique [2]. Selon lui, ce n'est pas un fluide, mais une forme de transe cérébrale, un état comparable à un sommeil profond. Il met en évidence que l'état hypnotique peut être induit par une focalisation intense de l'attention sur un stimulus physique. Il développe une technique consistant à fixer un objet, souvent un point lumineux, pour faciliter l'initiation de cet état hypnotique. Ainsi, l'hypnose découle d'une combinaison de psychologie et de savoir scientifique, où le rôle de l'hypnotiseur est avant tout celui d'un facilitateur.

En 1829, le chirurgien français Jules Cloquet réalise la première intervention chirurgicale sous hypnose, sans recourir à aucun anesthésiant chimique, une tumorectomie mammaire avec curage ganglionnaire. La patiente reste sans douleur, sa seule réaction étant des rires en fin de procédure [3]. Quelques années plus tard, le chirurgien écossais James Esdaile réalise environ 300 interventions en chirurgie urologique exclusivement sous hypnose entre 1845 et 1851. Il rapporte une diminution considérable de la mortalité passant de 45 % à 5 % [4].

Avec l'émergence progressive des anesthésiques modernes, l'éther et le chloroforme, l'hypnose en plein développement jusqu'alors, voit sa place remise en question. En 1846, le dentiste William Morton réalise la première intervention sous anesthésie générale grâce à l'éther. Cependant, l'une des figures marquantes de l'hypnose appliquée à l'anesthésie est Alice Magaw (1860–1928), infirmière américaine formée à Chicago à la fin du XIX^{e} siècle. Elle exerce à l'Hôpital St. Mary's de Rochester, travaillant avec les Drs William et Charles Mayo. Reconnue pour sa maîtrise des techniques d'anesthésie, elle associe l'hypnose à l'anesthésie pharmacologique ce qui permet de réduire considérablement les doses d'éther et de chloroforme administrées [5]. Cette méthode constitue le début de ce que l'on appellera plus tard l'hypnosédation.

Ce n'est qu'à partir du milieu du XX^{e} siècle que l'hypnose connaît un véritable tournant, avec Milton H. Erickson, psychiatre américain dont les travaux marquent un renouveau dans l'application de l'hypnose. Il est désigné comme le fondateur de l'hypnose moderne. Ayant lui-même été atteint de poliomyélite, l'autohypnose l'aide énormément à gérer ses douleurs. Après s'être formé à l'hypnose classique très directive, il développe des modes d'inductions variés et met l'accent sur l'individualité de chaque patient. La communication devient un outil thérapeutique avec une implication active du patient dans l'état hypnotique. Dans cette

approche, l'utilisation de métaphores permet au patient de trouver dans son inconscient la solution à son problème. Cela procure aux patients la capacité de s'exclure de leur environnement immédiat en puisant dans leur contexte de vie un souvenir agréable et confortable et donc les aide à dépasser leurs limites [6]. À partir des années 1950, l'hypnose Ericksonienne connait une propagation importante. A sa mort, son modèle d'hypnose reçoit l'appellation d'hypnose Ericksonienne.

2.2 L'hypnose thérapeutique

Au cours des dernières décennies, l'hypnose thérapeutique s'est largement répandue dans divers domaines médicaux. Dans ce cadre, l'hypnose consiste à induire par la parole un état de conscience modifié qui va focaliser l'attention du patient et atténuer la conscience périphérique. Il s'en suit un relâchement du corps, une attention sélective et une concentration accrue sur les perceptions internes. L'hypnothérapeute invite le patient à puiser dans son imagination et peut ainsi l'accompagner par des suggestions afin de moduler la perception des stimuli désagréables telle la douleur ou l'angoisse. Des études neurofonctionnelles des années 1990 ont montré qu'en état d'hypnose, le débit sanguin cérébral augmente particulièrement dans les zones occipitales, pariétales, motrices, préfrontales et cingulaires, régions impliquées dans les images mentales et le contrôle de l'attention [7]. L'année suivante, l'équipe liégeoise de Faymonville a utilisé le PET scan pour démontrer que, lors de stimuli douloureux sous hypnose, le flux sanguin augmente principalement dans le cortex cingulaire antérieur, en plus des aires corticales occipitales et du cortex visuel [8]. En résumé, une séance d'hypnose active plusieurs canaux cérébraux qui permettent de moduler la perception et le vécu du patient, aboutissant à une meilleure "évaluation sensori-discriminative, émotionnelle et cognitive du stimulus nociceptif" [9]. Une séance typique d'hypnose, guidée par un professionnel de la santé formé, commence par la mise en place d'une relation de confiance et un partage de l'historique du patient afin que le praticien puisse s'inspirer des ressources internes du patient. En second lieu, l'hypnothérapeute induit l'état de transe et peut projeter le patient dans un « lieu de sécurité », lieu imaginaire, agréable qui permet d'augmenter la sureté intérieure du patient. Cette projection est suivie d'une série de suggestions positives en relation avec la situation et de l'objectif attendu. Avant que le patient ne soit ramené à son état de conscience normal, la séance se termine par des suggestions post-hypnotiques, orientées à suggérer au patient ce qu'il fera après la séance, ainsi que des techniques d'ancrage, moyens qui permettent au patient de

reprendre le dessus et d'apaiser le système limbique en alerte quand le patient vit un énorme stress.

L'hypnose peut être utilisée dans plusieurs champs thérapeutiques : les troubles dits psychosomatiques, les troubles de la dépendance et les troubles alimentaires, les douleurs chroniques et aigües. Le recours à l'hypnose pour le traitement des troubles alimentaires parait prometteur [10,11]. L'application de l'hypnose, plus précisément de l'autohypnose, montre un intérêt dans la gestion multimodale des douleurs chroniques [12–14]. Elle trouve sa place dans l'accompagnement des patients et le traitement symptomatique des maladies oncologiques [15,16]. Finalement, elle peut également être appropriée pour l'approche d'un soin chirurgical et, pour ce qui nous concerne particulièrement, en anesthésie.

2.3 Hypnose et anesthésie

Aujourd'hui, l'attente des patients est de recevoir des soins dans les meilleures conditions de sécurité et de confort. Le moment du passage au bloc opératoire est une source d'inconforts, aussi bien physiques (sensation de froid, bruits) que psychiques (anxiété, peur, sentiments d'abandon...) pour les patients. En anesthésie, particulièrement avant une anesthésie générale, l'hypnose peut être un outil afin de préparer le patient aux différentes procédures médico-chirurgicales. Elle reste un moyen peu coûteux, sûr et ne nécessitant aucun équipement spécial, autre que la formation des thérapeutes [17]. Elle peut soit remplacer entièrement l'anesthésie conventionnelle pour des interventions peu invasives, soit être associée à une anesthésie locale et/ou à une sédation légère, décrite alors comme *hypnosédation*. L'hypnose peut offrir une alternative à l'anesthésie générale avec des indications bien connues aujourd'hui. Remplacer un coma pharmacologique lorsqu'il n'est pas indispensable est rassurant pour beaucoup de patients et une alternative intéressante pour les anesthésistes. Cette possibilité peut être encore attrayante pour des patients avec d'importantes comorbidités. Ainsi, l'hypnose leur permet de développer le sentiment de disposer de ressources, d'être capables de s'occuper d'eux-mêmes dans ces circonstances difficiles. L'hypnose peut également être pratiquée de façon supplémentaire, pendant la phase postopératoire. Enfin, l'autohypnose peut être enseignée au patient qui, lors de soins répétés, pourra lui-même effectuer une auto-induction d'une transe hypnotique et bénéficier ainsi du confort procuré par celle-ci. À tout moment de l'accompagnement périopératoire par hypnose, les pensées du patient sont modifiées grâce à ses propres ressources. Cela lui permet de retrouver une autonomie et un

sentiment de contrôle, tout en jouant un rôle actif dans sa prise en charge. De ce fait, l'anesthésie, la chirurgie et les suites postopératoires s'en trouvent souvent plus fluides. L'hypnose médicale peut être aujourd'hui une composante de l'anesthésie, qu'elle soit générale, locorégionale, ou locale. l'équipe australienne de Slater a clarifié l'importance de se former et d'intégrer les techniques hypnotiques dans la pratique clinique de tout anesthésiste afin d'améliorer les soins [18].

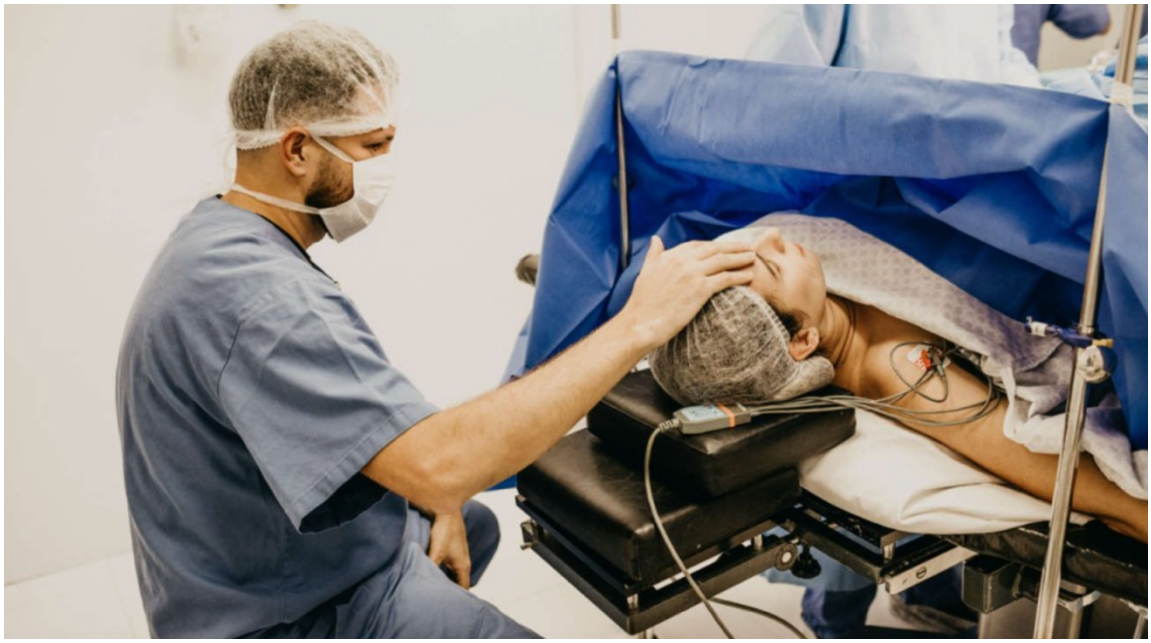


Photo 1: Séance d'hypnose pendant une intervention. Source: Pexels.com; Photo par Jonathan Borba. https://www.pexels.com/photo/man-holding-another-man-s-head-3279196/

Photo 2: Accompagnement par hypnose durant la mise en place de la péridurale dans le service de la Maternité, Hôpitaux Universitaires de Genève, Genève, Suisse. Photo par Melody Favre. La patiente et les personnes présentes ont donné leur consentement oral pour la publication.

Preuve d'efficacité ?

Plusieurs publications suggèrent une efficacité de l'hypnose dans la diminution de l'anxiété lié à la chirurgie ainsi que la perception et la gestion de la douleur. Dans une étude sur des patients opérés de thyroïdectomie, l'évaluation de l'anxiété au premier jour postopératoire, ainsi qu'au 10ème jour et à un mois, a montré que les patients du groupe hypnose présentent des niveaux d'anxiété statistiquement et cliniquement inférieurs à ceux du groupe ayant bénéficié d'une anesthésie générale avec une diminution supérieure à un point sur l'Echelle Visuelle Analogique [19]. Ces résultats sont retrouvés aussi dans l'étude de l'équipe de Faymonville [20]. Une étude de 2006 montre que l'accompagnement par hypnose avant l'intervention réduit significativement l'anxiété des patients, tant à l'arrivée au bloc opératoire qu'au moment de la sortie, comparé aux patients dans le groupe contrôle [21]. Des études ultérieures menées lors de chirurgies sénologiques, ont confirmé ces résultats à partir d'échantillons plus larges [21,22]. Ainsi en 2022, l'équipe chinoise de Zeng publie une méta-

analyse incluant 8 études avec plus de 1000 patients qui met en évidence un effet bénéfique de l'hypnose sur l'anxiété lors d'interventions sénologiques mineures sous anesthésie générale [23]. La réduction de l'anxiété périopératoire est aussi décrite chez les enfants [24,25]. Plusieurs études suggèrent l'intérêt de l'hypnose dans l'analgésie peropératoire et postopératoire, avec des diminutions significatives de consommation de morphine jusqu'à cinq jours postopératoire [26,27]. L'étude de Amraoui de 2018 sur des patientes ayant bénéficié de séances d'hypnose en préparation à leur chirurgie du sein, suggère une réduction d'utilisation d'opioïdes peropératoire dans le groupe hypnose, avec des scores de fatigue et d'anxiété significativement plus faibles le soir de l'intervention [28]. En 2021, une mise à jour par l'équipe de Holler d'une méta-analyse de 2013, publiée par la même équipe allemande, étudie l'efficacité de l'hypnose chez les adultes subissant des interventions chirurgicales en comparaison aux soins standard. Dans cette mise à jour, 50 études randomisées contrôlées éligibles ont été analysées (23 rajoutées au pool d'études existants) portant sur 4 269 patients [29]. Elle révèle des effets positifs de l'hypnose sur la détresse mentale, la douleur, la consommation de médicament et la récupération. La généralisation des résultats de cette étude à la pratique en anesthésie reste limitée en raison de la grande hétérogénéité des données d'une part mais surtout car l'impact de l'hypnose selon le point de vue d'un anesthésiste reste peu clair. De ce fait, la consommation des médicaments n'est pas clairement documentée. Cette étude prend en compte tout médicament sans distinction, et ne différencie pas les familles d'hypnotiques, d'analgésiques opioïdes ou non-opioïdes, d'antiémétiques, de vasopresseurs, etc. L'efficacité de l'hypnose sur la réduction de « médicaments » ne peut ainsi pas être correctement interprétée et il en découle une difficulté de tirer des conclusions sur les conséquences cliniques de ce résultat. A noter que plusieurs études incluses abordent l'hypnose dans les cabinets de soins dentaires, qui n'implique pas la présence d'un anesthésiste. De plus, l'analyse ne prend pas compte de la modalité d'hypnose (hypnose en complément à une anesthésie générale, hypnosédation, autohypnose, hypnose seule), ni le moment de l'implémentation de l'hypnose (avant, pendant ou après la chirurgie). Cette étude laisse donc les anesthésistes sur leur faim. En effet, en tant qu'anesthésiste, il serait pertinent de disposer de données plus ciblées. Depuis 2021, on voit la publication de nouvelles études randomisées contrôlées dans le domaine de l'hypnose périopératoire qui ramènerait peut-être de nouvelles précisions sur cet outil qui parait prometteur.

3. Objectif

L'objectif de mon analyse de la littérature est d'abord de pouvoir décrire l'ensemble des différentes utilisations de l'hypnose dans le contexte périopératoire, et de synthétiser l'évidence disponible à ce jour et son impact du point de vue d'un anesthésiste. Ainsi, je me focalise sur l'évaluation de l'utilité du recours, *par l'équipe d'anesthésie*, à l'hypnose dans le cadre *périopératoire*. Je tenterai de répondre aux questions suivantes :

Des séances d'hypnose en préparation à la chirurgie ainsi que des séances d'accompagnement immédiatement avant et/ou pendant le geste auraient-ils un impact tangible sur la diminution d'hypnotiques et/ou d'opiacés peropératoires ?

Serait-il possible de confirmer cette efficacité théorique par une détection de meilleurs scores de douleur et d'une moindre consommation d'antalgiques en postopératoire ? par une diminution du taux de nausées et de vomissements postopératoires? L'adjonction d'hypnose en périopératoire peut-elle moduler l'anxiété, rendant l'expérience des patients plus agréable et moins traumatique ? Enfin, cet outil risque-t-il de retarder la prise en charge en prolongeant la durée de la procédure?

En revoyant l'ensemble de la littérature publiée dans ce contexte, j'ai l'objectif de distinguer les différents domaines d'applicabilité de l'hypnose et de faire un état de lieux de l'utilisation de l'hypnose en anesthésie en 2025, près de 50 ans après la réintroduction de l'hypnose dans le domaine de l'anesthésie. Cette vue d'ensemble me permettra également de détecter les lacunes dans la littérature et de définir de futures opportunités de recherche.

Les chapitres suivants, rédigés en anglais, correspondent aux sections méthode, résultats et discussion de l'article: Lahoud MJ, Gurary ST, Elia N. Hypnosis for anaesthetists: a systematic review with meta-analyses; *Anaesthesia*, Accepted in July 2025.

4. Methods

The protocol for this systematic review was published in Prospero (CRD42024538362) and the reporting follows the PRISMA recommendations [30]. We changed the planned analyses by stratifying all results based on the timing of hypnosis administration to provide results more relevant to anaesthetists.

We included studies of any design in which hypnosis was used for any intervention requiring the presence of an anaesthetist, alone or in combination with any type of anaesthesia, on children and adults. We included studies exploring hypnosis for lumbar punctures, due to the similarity of the technique with spinal anaesthesia, and for transoesophageal echography as this procedure is performed in presence of anaesthetists in some centres. Any type of formal hypnosis was considered. We did not include studies on hypnosis for chronic pain, those related to obstetrics, dentistry, bone marrow puncture, or burns. Studies involving informal hypnosis, hypnotic communication, muscle relaxation, suggestions without formal hypnosis session, or those using virtual reality or music were excluded. Narrative reviews or surveys were not considered.

A comprehensive search was conducted in PubMed, Embase and the Cochrane library in April 2024, and updated in February 2025 with the help of a librarian from the Faculty of Medicine of the University of Geneva, Switzerland. Bibliographies of systematic reviews and of retrieved studies were examined for additional references. A highly sensitive search strategy, without restriction on the publication period or language, was applied (see online Supporting Information Appendix S1). Studies were selected using Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia) [31], and the inclusion criteria were verified for all retrieved trials, by the three authors separately (MJL, NE, STG). Two authors (MJL, STG) independently extracted data from included studies and entered them into an excel sheet specifically designed for the purpose of this study. Any disagreements were resolved through discussion with the third author (NE). Data were verified by both authors to ensure accuracy and consistency. Data extracted included: name of the first author; publication year; country where the study was performed; study design; timing of hypnosis administration; type of anaesthesia; type of surgery or procedure; hypnosis practitioner; patient characteristics (gender and age); and all reported outcomes. We contacted authors to obtain missing data when required.

The primary qualitative outcome was the description of all retrieved studies and settings in which hypnosis was used by anaesthetists. The primary quantitative outcomes were the intra-intervention consumption of hypnotics and opioids. Secondary quantitative outcomes included pain scores and postoperative analgesic use, anxiety scores, satisfaction scores (for patients and the medical team), complications, postoperative nausea and vomiting (PONV), durations of the procedure, of Post-Anaesthesia Care Unit (PACU) and of hospital stay.

We stratified all meta-analyses on three timing of hypnosis implementation: pre-intervention; per-intervention (hypnosis provided during the procedure/surgery with or without a pre-intervention session); and post-intervention (with or without a pre- or per- intervention session). To make the evidence as robust as possible, we report estimates based on RCTs only in the main text.

Differences in continuous outcomes were computed at the study level and combined into a mean difference (MD), while binary outcomes were combined into weighted risk ratios (RR). Standardized mean differences (SMD) were computed when an outcome was reported using different scales and 95% confidence intervals were used for all measures. Random-effects models were used throughout due to the expected clinical heterogeneity across studies. For studies reporting medians and interquartile ranges (IQRs), or ranges, we computed the means and SDs using the methods recommended in the Cochrane Handbook for Systematic Reviews of Interventions [32,33]. When a single study reported on an effect that was largely different from the other studies, it was excluded from analyses. When an outcome was reported at different time points in the trials, we focused on the time point most frequently reported across trials. Then, when possible (i.e. enough trials available), we regrouped the time points into early (0-6h), intermediate (6h-24h) and late (>24h) time points and assessed the result of the statistical test for heterogeneity across groups. When no statistical evidence of difference was found, the time points were pooled. We added the information provided in NRCSs, which included non-randomized experimental trials and cohort studies with a control group, in separate additional analyses. Analyses were performed on STATA 18 (StataCorp, College Station, TX, USA) and cross checked in RevMAN (The Cochrane Collaboration, London, UK).

The risk of bias was assessed according to each outcome using the Revised Cochrane risk-of-bias tool for RCTs [34] and the Robins-I tool [35] for non-randomized controlled studies (NRCSs). For RCTs, if lack of blinding was unlikely to affect the interpretation of the outcome, we considered the risk of bias as low. For both RCTs and NRCSs, selective reporting bias was deemed high when there was a discrepancy between the outcome described in the registered protocol and those reported in the article, and as intermediate in case of doubt due

to the absence of a registered protocol. Studies with critical risk of biases were excluded from analyses. The level of confidence in the point estimates was judged using the GRADE recommendations [33].

5. Results

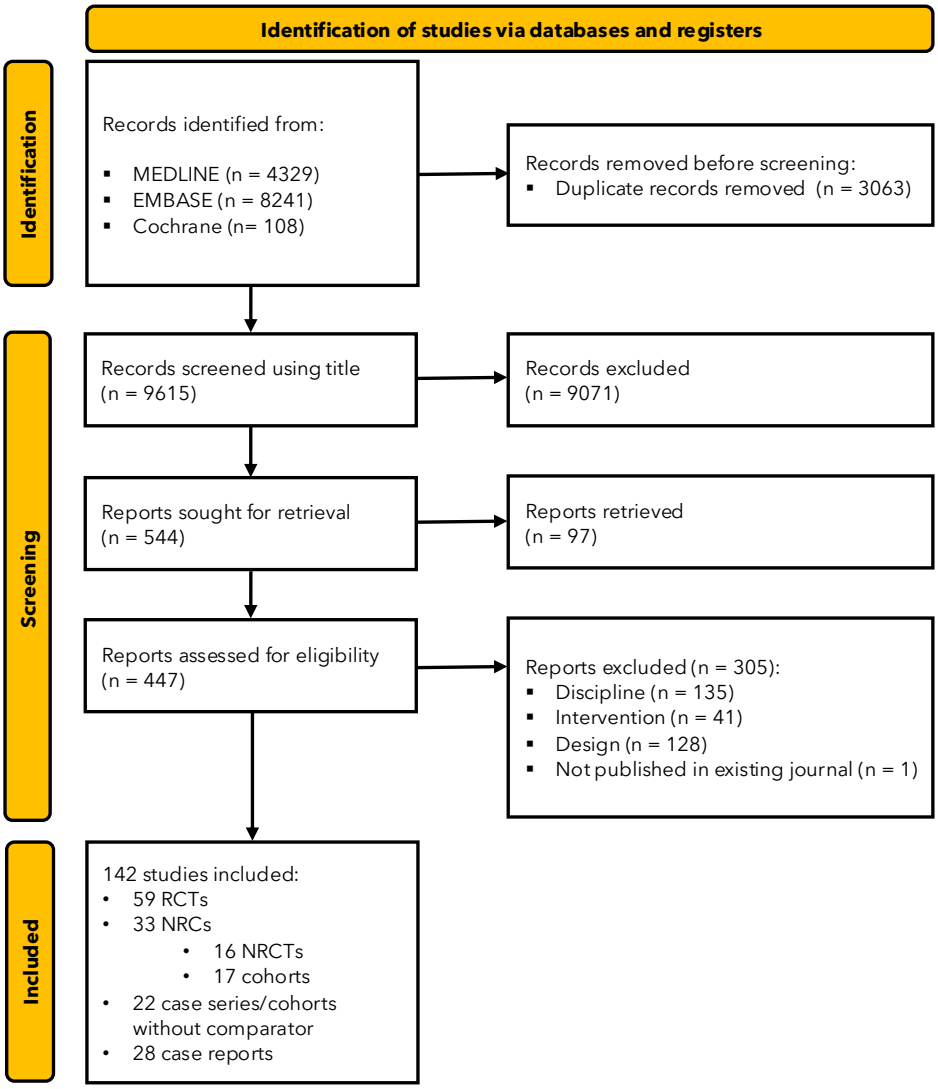
The initial search yielded 12,678 records. After removing double hits and screening titles for relevance, 12,134 records were excluded. The remaining 544 articles were assessed for eligibility by reading the full texts; 402 did not meet our inclusion criteria leaving 142 studies included in the analyses. Six authors were contacted; two answered our queries. The 142 included studies (9238 patients, 8319 adults and 919 children) were regrouped by us into four design categories. The first category included 59 RCTs (4996 patients) [19–22,25–28,36–86]. The second category included 33 NRCSs (3191 patients) consisting of 16 non-randomized controlled experimental trials and 17 cohort studies including a control group. The third category included 22 reports of more than one patient lacking a control group (1023 patients), therefore not allowing for the estimation of the effect of hypnosis (cohort studies without comparator, or case series). The last category included 28 case reports (see Figure 1 and online Supporting Information Appendices S2-S6).

Of the 50 RCTs included in the previous meta-analysis [29], 19 did not fulfil our inclusion criteria and 28 new RCTs were included. Reasons for excluding articles were that they focused on conversational hypnosis (6) or virtual reality (1), on dentistry (5), burn management (1), or were dissertations (4) and abstracts (2).

Included studies were published from 1955 to 2025, of which 122 (86%) were published after year 2000, and originated from 19 countries. Forty-nine were conducted in France, 25 in the USA, 9 in the United Kingdom and 8 in Italy. Seventeen studies originated from six different countries in Asia. Seven RCTs, 6 reports without comparator, 4 case reports and 3 NRCS focused on children aged from three to 18 years old (median 10). There was a large heterogeneity in the surgeries and procedures examined, type of anaesthesia and timing of hypnosis administration (Table 1). The most studied fields were breast surgeries (18), cardiac related procedures (17), gynaecology (14 studies) and orthopaedic procedures (10). Hypnosis was performed before the intervention only in 32 studies, pre- and/or per-intervention in 96, or post-intervention (with or without pre- and/or per-intervention sessions) in 14. Hypnosis was provided by an anaesthetist (42 studies), a nurse (14), a hypnotherapist (13), a psychotherapist (11), an anaesthetist or a nurse (6), and by a non-anaesthetist physician (4). The practitioner was not specified in 25 studies. In 11 studies hypnosis was auto-induced (self-hypnosis), audio recording was used in 15, and one trial applied a script. The hypnosis technique was described in detail in 108 articles, with 17 providing the complete script.

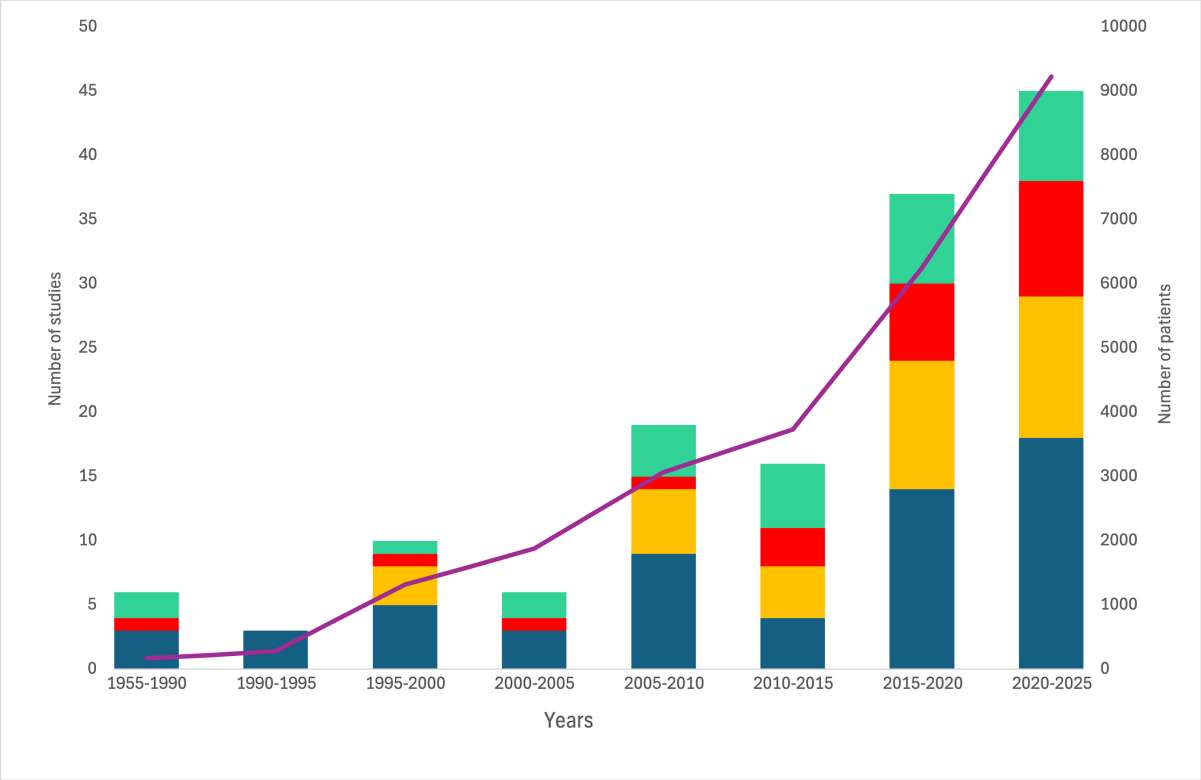
Ericksonian hypnosis [6] was specifically reported in 22 articles. The use of hypnosis through suggestions was reported in 92 articles. Among these, 22 explicitly described the ‘safe place’ technique. Metaphors were used in 16 articles, including five describing the 'magic glove' technique [87]. The detailed characteristics of the included studies are provided in online Supporting Information Appendices S2-S5. Figure 2 illustrates the evolution of study designs over time.

Figure 1: Study flowchart.



n: number; RCTs: randomized controlled trials; NRCSs: non-randomized controlled studies; NRCTs: non-randomized controlled trials.

Figure 2: Temporal distribution of studies.



Blue: randomized controlled trials; saffron: non- randomized controlled studies; red: uncontrolled studies of more than one patient; teal: case reports; violet line: cumulative number of patients.

Table 1: Hypnosis timing and type of anaesthesia, categorised according to type of intervention.

		Hypnosis timing			**Type of anaesthesia**				
Surgeries	n	PRE	PER	POST	LA/LR	GA	AS+LA	SC	None
Breast surgery	18	7	9	1	5	8	3	-	1
Cardiac related	17	4	11	3	6	7	3	2	-
Parathyroid and thyroid surgery	7	-	6	1	2	3	2	-	-
Dermatology and plastic surgery	7	1	6	-	-	1	3	1	2
Otolaryngology	5	1	4	-	1	2	1	-	1
Gynaecology	14	4	10	-	2	4	3	2	3
Neurosurgery	9	1	8	-	2	3	4	-	-
Oncology	2	-	-	2	-	2	-	-	-
Ophthalmology	6	2	3	1	4	1	-	-	1
Orthopaedic	10	3	5	2	3	5	-	1	1
Radio/percutaneous	9	-	8	1	4	1	1	1	2
Thoracic	3	1	-	2	-	3	-	-	-
Urology	3	1	2	0	1	1	-	-	1
Visceral	5	1	3	1	-	4	1	-	-
Procedures									
Endoscopy	6	1	5	0	2	-	2	-	2
Lumbar puncture	3	1	2	0	3	-	-	-	-
Mixed surgeries	6	2	4	-	1	2	1	2	-
TOE	4	1	3	0	1	-	2	1	-
Venipuncture	8	1	7	0	3	-	3	-	2
Total	142	32	96	14	40	47	29	10	16

PRE: pre-intervention; PER: per-intervention; POST: post-intervention; LA/LR: local or locoregional anaesthesia; GA: general anaesthesia; AS+LA: analgosedation and local anaesthesia; SC: standard care; TOE: transoesophageal echography; n: number of studies.

Twenty-two RCTs examined the impact of hypnosis when implemented prior to the intervention (see Table 2 for full results). There was a low level of evidence of a reduction in post-intervention pain and moderate evidence of a reduction in post-intervention anxiety following pre-intervention hypnosis. Clinical relevance was graded as moderate and high respectively. One study examining anxiety [70] reported a result that was markedly different from the others RCTs and was excluded, however including the outlier RCT [70] did not impact the pooled result (SMD -1.01; 95%CI -1.52 to -0.51).

Twenty-eight RCTs examined the impact of hypnosis implemented during the intervention (see Table 2). We found moderate evidence of a reduction in per-intervention pain intensity (high clinical relevance), low evidence for a reduction in post-intervention anxiety (high clinical relevance), and high-quality evidence for a reduction in PONV (high clinical relevance). Additionally, there was moderate evidence of a lack of impact of hypnosis on post-intervention pain, on the need for class III analgesics and on patient satisfaction, and a clinically non-relevant decrease in the duration of the procedure of about 2 minutes. Fewer than three RCTs reported on other outcomes. Forrest plots of pain and anxiety scores are represented in Figure 3 and Figure 4.

Nine RCTs examined the impact of hypnosis implemented after the intervention, all of which combined the post-intervention session with a pre-intervention session [36,39,44,46,56,79,82], a per-intervention session [76], or both [77]. Fewer than three RCTs reported on each outcome.

Six NRCSs examined the impact of hypnosis when implemented prior to the intervention. Integrating data from these NRCSs into the RCTs-based analyses gave consistent results regarding the ability of pre-intervention hypnosis to decrease post-intervention pain intensity and the trend towards a decreased need for class I-II analgesics, showing a similar point estimate and a result becoming statistically significant. It also suggested a potential to decrease propofol consumption by about 25 mg, and to decrease PACU stay by 13 minutes (online Supporting Information Appendix S7).

Twenty-four NRCSs examined the impact of hypnosis implemented during the intervention. Adding the evidence from these NRCSs provided additional evidence regarding the ability of per-intervention hypnosis to decrease pain intensity during the intervention, to decrease anxiety post-intervention, and to decrease PONV. It also added data to the trend towards decreased pain intensity after the intervention showing a similar point estimate and a result becoming statistically significant, and the lack of impact of per-intervention hypnosis on patient satisfaction and on procedure duration. New evidence based on these NRCSs included

a potential to decrease propofol consumption by about 112 mg, to decrease the need for additional per-intervention analgosedation, to decrease PACU stay by about 47 minutes, and suggested a lack of impact of per-intervention hypnosis of medical team satisfaction. Three NRCSs examined the impact of hypnosis implemented after the intervention. Adding the evidence from these NRCSs to the results based on RCTs suggested a lack of impact of post-intervention hypnosis on pain intensity (online Supporting Information Appendix S7, all detailed figures and risk of bias assessments for RCTs and NRCs available in Appendix S8).

Table 2: Summary of results.

	Pre-intervention (22 RCTs)					Per-intervention (28 RCTs)				
	RCTs	n	Estimate (95% CI)	I^2	Grade of evidence	RCTs	n	Estimate (95% CI)	I^2	Grade of evidence
Primary outcomes										
Any opioid during the intervention	3	266	-0.64 (-1.40 to 0.13)	82%	moderate					
Secondary outcomes										
Pain during the intervention (VAS cm)						6	811	**-1.14 (-1.86 to -0.41)**	91%	moderate
Pain after the intervention (VAS cm)	7	419	**-0.88 (-1.72 to -0.05)**	87%	low	7	927	-0.51 (-1.46 to 0.43)	90%	moderate
Need for class I-II analgesic (yes/no)	3	212	0.30 (0.06 to 1.60)	84%	moderate					
Need for class III analgesic (yes/no)						4	340	0.77 (0.53 to 1.13)	81%	moderate
Anxiety after the intervention (score)	8	515	**-0.76 (-1.14 to -0.38)**	76%	moderate	8	963	**-0.44 (-0.75 to -0.13)**	79%	low
Patient satisfaction (VAS cm)						4	465	0.27 (-0.18 to 0.72)	62%	moderate
PONV (yes/no)						3	185	**0.43 (0.25 to 0.74)**	0%	high
Procedure duration (min)						7	1134	**-2.02 (-3.81 to -0.23)**	51%	moderate

Estimates are reported as risk ratios for binary outcomes, standardised mean difference for opioid and anxiety scores, and mean difference for VAS scores. In bold: statistically significant results; n: number of patients in RCTs reporting on the outcome. Analyses are presented for all outcomes reported in 3 RCTs or more.

Figure 3: Meta-analyses for VAS Pain intensity: (a) after the intervention following a pre-intervention hypnosis session; (b) during the intervention following per-intervention hypnosis session.

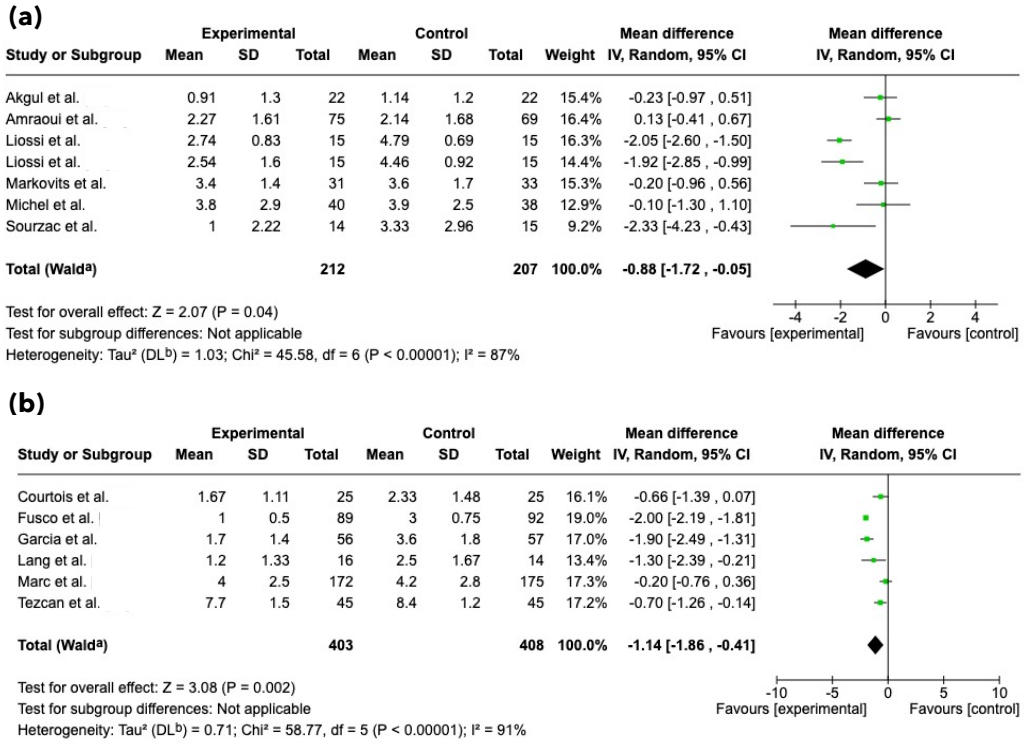
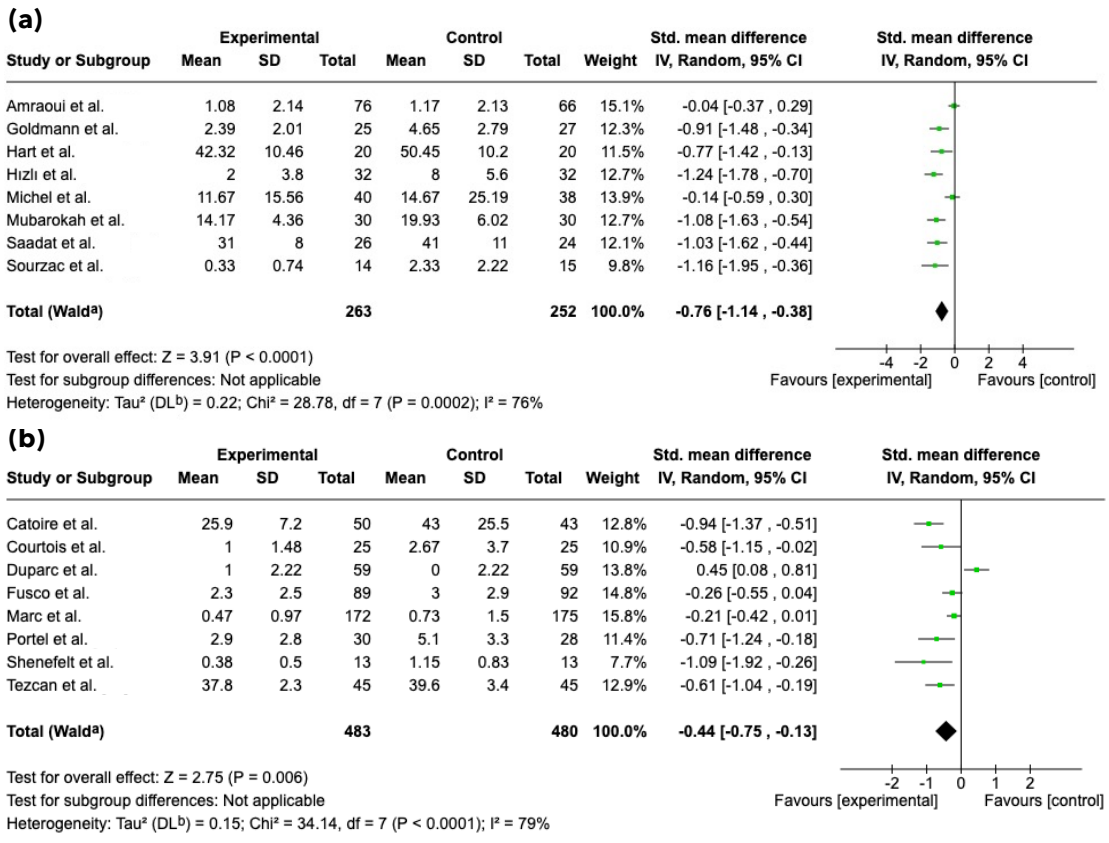


Figure 4: Meta-analyses for anxiety after the intervention: (a) following pre-intervention hypnosis session; (b) following per-intervention hypnosis session. Std: standardized mean differences.



6. Discussion

This review summarizes the available evidence regarding the use of hypnosis in the peri-intervention setting, from an anaesthetist's point of view. Our work illustrates different methodological points. First, hypnosis has been studied for about 70 years, in many countries, in a wide variety of clinical settings, combined to all types of anaesthesia. Despite 142 identified studies describing 9238 patients, of which 59 were RCTs, the overall quality of the retrieved studies was weak and the level of evidence of the impact of hypnosis in this setting ranges from absent to moderate. Second, most of the retrieved studies concerned gynaecological procedures including breast surgery, followed by cardiac related procedures. Third, hypnosis was mainly implemented before and during the interventions; hypnosis applied after the intervention was barely examined. Fourth, despite wide heterogeneity among the studies, the hypnosis technique itself remained consistent, mainly employing suggestions and metaphors. Fifth, hypnosis was applied by different practitioners with a large variability of outcomes reported illustrating the lack of clear research agenda and of clear expectations regarding what hypnosis is expected to improve. Finally, well performed RCTs with adequate blinding of investigators exist, are feasible and should be aimed for.

Our work also clarifies some clinical points. Pre-intervention hypnosis may reduce anxiety and pain after the intervention, which is clinically relevant. The data concerning per-intervention hypnosis suggest that it could decrease pain intensity during the procedure by about 1 cm on the 1-10 cm VAS scale without impacting on pain intensity after the procedure, reduce anxiety after the procedure, and reduce the risk of PONV by half, with grades of evidence ranging from moderate to high. All these endpoints are important to patients. Adding data from NRCSs to RCTs confirmed these benefits. Evidence regarding the impact of post-intervention hypnosis sessions is lacking.

These findings need to be discussed considering what is already known. The minimal clinically relevant difference in VAS pain score was shown to be as high as 2 points on the 11 points numerical pain scale for chronic pain [88,89], and to differ widely across clinical settings and baseline pain [90]. In the postoperative period, where good analgesia can be achieved with pain scores < 4 cm, a difference of 1 cm has been suggested to be cinically important [91] . In this context, the reduction achieved through hypnosis appears particularly relevant. Interestingly, patients tend to experience less pain when hypnosis is used alongside a procedure, but without any difference in pain score after the procedure. This may reflect variations in pain perception. Brain imaging studies suggest that hypnosis can modulate

subjective pain perception by influencing two distinct brain regions: the somatosensory cortex, which processes pain intensity, and the anterior cingulate cortex, which handles pain unpleasantness [92]. Therefore, hypnotic suggestions that focus on comfort and reducing pain unpleasantness may not alter the reported intensity of pain but can improve the overall perception of pain. Unfortunately, there is no validated measurement of the perception of pain, and our result contrasts with previous studies [23,93]. Postoperative anxiety is a relevant outcome for both patients and anaesthetists, and its reduction through hypnosis could also improve the risk of chronic pain development [94]. The ability of hypnosis to reduce post-intervention anxiety makes it appealing. Key priority for anaesthetists and patients is the management of PONV. It has been suggested that hypnosis may have a place in treating and preventing nausea and vomiting during pregnancy [95], as well as during chemotherapy [96], and our study suggests that it may also have an impact in the peri-intervention setting, where per-intervention hypnosis was showed to decrease the risk of PONV by half. This large effect, which is highly clinically relevant, is comparable to that observed with intravenous dexamethasone [97]. However, it is based on only three RCTs and should be confirmed in future trials. The slight reduction in propofol dosage observed in patients who undergo pre-intervention hypnosis sessions is likely of limited relevance to patients themselves, but it may be of interest to anaesthetists. This reduction could be clinically meaningful in specific contexts, such as in elderly patients or those with cardiac insufficiency or hemodynamic instability. The reduction of analgosedation needs provide new and clearer perspectives for anaesthetists than the findings from Holler's meta-analysis [29], where the authors reported less "medication consumption" but combined all sorts of medications. However, these reductions in analgosedation needs should be interpreted cautiously, as our results are based on only two RCTs and one NRCS and the lack of blinding of the anaesthetists in these studies could have influenced the administration of hypnoanalgesics. The absence of impact of per-intervention hypnosis on patient satisfaction was a surprise. This may be explained by a ceiling effect with patients being all highly satisfied with their care, whether hypnosis is used or not, making it difficult to detect meaningful differences. This is well recognized in the field of pain, summarized as "no pain, no gain" [98]. Nevertheless, as hypnosis is increasingly added to patient care [99], future rigorous studies are needed to clarify its impact on patient satisfaction. Also, we found a wide range of actors delivering hypnosis in the peri-intervention context. This highlights the potential for collaborative practices. Trained nurses and psychologists can deliver peri-intervention hypnosis, working in close collaboration with the surgical and anaesthesia teams [100]. The role of the patients as an active proponent of their intervention

through self-hypnosis is also interesting as it may result in competencies that could be used throughout their lives. As anaesthetists remain the main hypnosis providers in these studies, they could be trained in this field. A recent publication exposed a pragmatic approach to help anaesthetist integrate hypnotic techniques into their daily practice [18].

Our study has limitations. First, despite an exhaustive search, relevant studies may have been omitted. Our highly sensitive strategy identified publications from the 1950's that we were unable to access. From their (vague) titles, we do not know whether they would have been relevant to our review. Also, we did not search for unpublished studies. Second, the quality of the evidence produced is limited by the low quality of the studies identified. It is a shame that 70 years of publications on hypnosis in the peri-intervention setting has led to such poor evidence of its impact. This is due to both poor designs and inadequate reporting. Third, we had to deal with a huge heterogeneity across included studies. We chose an approach to be able to give meaningful answers to anaesthetists, based on the timing of hypnosis administration. Significant heterogeneity remained that was not all explained by differences in anaesthetic techniques and study designs. We did not check for the impact of the hypnosis practitioners or types of hypnosis administered. Meta-regression was not possible due to the small number of studies reporting on a given endpoint. Fourth, we converted data that were reported as median and IQR to means and SDs. This method is appropriate when the data are approximately normally distributed, and the sample size is sufficiently large, but remains an area of approximation. Fifth, some relevant results were inconsistently reported or could not be obtained even after contacting the authors. In one randomized trial, even the number of patients analysed per group was not clearly reported. This questions the quality of the peer-review of these studies. Finally, the grading of evidence of most of our results was moderate only, and although we analysed extensive data from approximately 5000 patients across 59 RCTs, we remained unable to settle on many relevant anaesthetic outcomes.

Our work aimed to help identify knowledge gaps that should guide future research. The impact of hypnosis sessions conducted in the post-intervention phase remains a largely overlooked topic. The impact of pre-intervention hypnosis sessions is also weak and deserves further well designed large RCTs. Evaluation of the cost-effectiveness of hypnosis sessions is needed and necessary to support hospital policy's adoption of this technique, although difficult to address. Finally, the main future challenge will be selecting outcomes that truly matter to patients in clinical practice. These should be explored in a patient and public involvement (PPI) perspective in future RCTs.

The evidence regarding the added value of hypnosis for anaesthetists in the peri-intervention setting is weak. This systematic review suggests that it may have an impact on anxiety following an intervention, on pain during and after the intervention and on PONV incidence when hypnosis is administered during the intervention. Its influence on most other clinical outcomes remains unknown.

7. Conclusion et synthèse

La question à l'origine de ce projet de recherche est vaste englobant l'effet de l'hypnose sur les issues qui concernent les anesthésistes. Des séances d'hypnose en périopératoire réduisent-elles les doses d'hypnotiques et/ou d'opiacés peropératoires ? De meilleurs scores de douleur/ d'anxiété et une réduction de la consommation d'antalgiques en postopératoire sont-ils notables ? Une diminution du taux de nausées et de vomissements ? De complications ? Un raccourcissement de temps de séjour en salle de réveil ? Aux Soins Intensifs ? A l'hôpital ? Après une première recherche dans la littérature scientifique, il s'est avéré que les éléments disponibles au clinicien étaient difficilement utilisables pour éclairer les anesthésistes ou pour valider l'adjonction de cette technique dans son arsenal thérapeutique. Nous avons alors décidé d'effectuer une revue systématique afin de rassembler l'ensemble des données, de les analyser et d'estimer si le recours à des séances d'hypnose en périopératoire pouvait apporter un bénéfice à la prise en charge anesthésique. Trois éléments principaux en sont ressortis. Le premier est méthodologique : la littérature disponible n'est pas nécessairement de très bonne qualité et souvent incomplète. Le second est plus pratique : en clinique les données observées varient en importance. Et le dernier est réflexif : l'hypnose est un outil prometteur pour améliorer la prise en charge périopératoire.

7.1 Points méthodologiques

Notre travail met en évidence la difficulté d'analyser et de synthétiser les données concernant l'hypnose en périopératoire malgré la présence de 142 études dont 59 RCTs. La première contrainte est la large variété et l'hétérogénéité des résultats collectés ainsi que la diversité des moyens de rapporter ses résultats. A titre d'exemple, pour quantifier l'anxiété six scores différents ont été utilisés. Pour mesurer des scores de douleur, des moments variés ont été appliqués (VAS chaque 15min) [77], VAS chaque deux heures [61], VAS à 1mois/3mois/6mois [56], etc..). Ceci nous incite à interpréter les résultats avec réserve. En second lieu, une grande variabilité de protocoles d'application d'hypnose existe. Dans la vaste majorité (128 articles), les séances d'hypnose ont été faites en préopératoire et/ou peropératoire, par différents corps de métier (anesthésistes, infirmiers, psychologues, médecins d'une autre discipline) et dans 15 études par des enregistrements. D'une part, c'est une richesse de voir que l'hypnose peut être appliquée à différents moments, par différents acteurs, mais

cela induit une grande hétérogénéité rendant des conclusions difficiles, avec une reproductibilité douteuse. Troisièmement, le risque de biais dans les études randomisées contrôlées est intermédiaire à élevé, avec principalement un biais d'absence de mise en aveugle des patients et des praticiens et d'absence d'enregistrement du protocole, révélant une insuffisance dans la robustesse de la méthodologie appliquée dans ce domaine. En dernier lieu, les résultats sont parfois rapportés d'une façon incomplète avec des moyennes rapportées en absence de déviations standards. Dans quelques études, des résultats pertinents sont rapportés sous forme de graphiques uniquement sans mesures de dispersions. Les auteurs ont été contactés pour supplément de données mais sans réponse. Ceci a malheureusement empêché d'inclure des données pertinentes.

Afin d'avoir un niveau d'évidence le plus élevé, notre analyse principale s'est concentrée sur les RCTs. Pour fournir des résultats pertinents pour les anesthésistes et pour essayer de remédier à l'énorme hétérogénéité des études, nous avons regroupé les études selon le moment d'implémentation de l'hypnose. En un second temps et afin de répondre à la question posée de la manière la plus complète possible, nous avons choisi quand même de ne pas se limiter uniquement aux RCTs mais de prendre en considération tous les designs d'étude. On a pu retirer des données des études non-randomisées avec un groupe contrôle. Les cohortes sans comparateurs et les cas cliniques ont été intéressants afin d'avoir un œil descriptif sur la pratique de l'hypnose. De plus, ils nous ont permis de détecter l'applicabilité de l'hypnose dans tous les domaines, même si c'est uniquement ponctuellement pour une indication particulière (ex : éviction de l'anesthésie générale chez un patient multi-allergique [101], ultrasons focalisés pour résection de nodule thyroïdien sous hypnose sans sédation profonde [102]). Cette documentation est intéressante pour les anesthésistes afin de les inciter à maitriser cette technique pour des applications spécifiques.

7.2 Points pratiques

Si on revoit le critère de jugement principal, la question se pose sur la pertinence clinique de cette diminution de dose de propofol (25mg si séances d'hypnose en préopératoire et 112mg si peropératoire) et d'opioïdes. Une population particulière pourrait en bénéficier avec une différence clinique pertinente (personnes âgées, patients avec des problèmes respiratoires ou autres comorbidités). Mais les données actuelles de la littérature ne nous permettent pas d'émettre une pareille conclusion.

Sur un autre plan, notre travail met en évidence le manque de données concernant les coûts engendrés par l'implémentation des séances d'hypnose en périoperatoire d'une part ainsi que les économies effectuées par l'impact de l'hypnose d'autre part. Prévoir un anesthésiste pour effectuer des séances d'hypnose en préopératoire nécessite par ailleurs une organisation des planifications de l'équipe et une mobilisation du patient, qui souvent est submergé par de nombreux rendez-vous médicaux en perioperatoire. Comme notre analyse l'a montré, l'hypnose tend à diminuer les doses d'hypnotiques et pourrait éventuellement diminuer le recours aux antalgiques en postopératoire. Les patients ont moins de nausées et vomissements avec une moindre utilisation d'antiémétiques. La durée de séjour en salle de surveillance post-interventionnelle est raccourcie d'une trentaine de minutes. Tous ces critères de jugement induiraient de façon indirecte des économies au système de santé. Des études futures doivent être effectuées afin de vérifier cette hypothèse.

L'amélioration des scores d'anxiété postopératoire est intéressante. La réduction de l'anxiété contribue à une meilleure expérience avec le respect des besoins émotionnels et psychologiques du patient. Cela est essentiel dans une ère où tout semble parfois aller très vite grâce à de nouveaux moyens technologiques. La prise en charge médicale nécessite une approche centrée sur le patient, où l'humain est placé au cœur des soins. L'hypnose pourrait être un moyen de consolider ce concept en périopératoire.

Concernant le temps de décharge de l'hôpital, beaucoup de facteurs non médicaux rentrent en jeu dans la décision de sortie du patient (facteurs organisationnels, sociaux, financiers). Nous n'arrivons pas à trancher sur le rôle de l'hypnose dans le raccourcissement du séjour du patient.

Un point intéressant mais peu ou pas abordé dans la littérature est le potentiel effet délétère des séances d'hypnose : effets secondaires (vertiges, nausées, céphalées), difficultés de retour de l'état de transe hypnotique ; ainsi que la mauvaise application de l'hypnose. Même si les complications associées à l'hypnose restent exceptionnelles, il est essentiel de procéder à une sélection soigneuse des patients, en tenant compte des contre-indications, notamment psychiatriques, telles que les troubles psychotiques ou la schizophrénie [103].

7.3 Points réflexifs

Lors de ma participation au congrès de l'ESAIC, où j'ai présenté mon travail sous forme de poster, j'ai constaté un vif intérêt de la part des anesthésistes pour l'hypnose, ainsi qu'une curiosité aux modalités concrètes de son implémentation au sein de notre département. J'ai été

surprise par le manque de diffusion des connaissances relatives à l'hypnose médicale. La seule approche s'y apparentant est l'utilisation du casque de réalité virtuelle, proposant des séances d'hypnose préenregistrées. Ceci peut être expliqué par les considérations économiques qui mettent l'hypnose à l'écart au profit d'une technologie plus facilement valorisable sur le plan financier. Un travail de recherche ciblé sur ce type de dispositif serait pertinent et constitue notre prochain projet.

Pour ma part, depuis 2017, j'ai intégré l'hypnose dans ma pratique quotidienne, offrant à mes patients des suggestions hypnotiques les aidant à se projeter dans un lieu réconfortant les quelques minutes lors de la pratique d'une anesthésie loco-régionale ou avant l'anesthésie générale, ma devise étant : "un patient qui dort bien, se réveille bien".

Je ne peux que constater que l'application de l'hypnose reste limitée par le manque de standardisation des protocoles et l'absence de formation systématique des professionnels de la santé. Avec davantage d'études rigoureuses et une formation plus répandue, l'hypnose pourrait devenir un outil complémentaire dans la prise en charge périopératoire moderne car cette approche non invasive semble pouvoir améliorer la prise en charge des patients.

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9. Annexes

Appendix S1- Search strategy

Appendix S2- Randomized controlled trials (RCTs)

Appendix S3- Non-randomized controlled studies (NRCS)

Appendix S4- Uncontrolled studies of more than one patient

Appendix S5- Case reports

Appendix S6- Bibliography of included studies

Appendix S7- Analyses Including NRCS Data

Appendix S8- Figures of quantitative analyses

Appendix S1- Search strategy

Embase:
('hypnosis'/exp OR 'hypnosis':ti,ab,kw OR 'hypnotherap*':ti,ab,kw OR 'hypnoti*':ti,ab,kw OR 'self-hypnosis':ti,ab,kw OR 'self-hypnotic':ti,ab,kw OR 'autohypnosis':ti,ab,kw OR 'hypnoa*nesthesia':ti,ab,kw OR 'hypnosedation*':ti,ab,kw) AND ('anesthesist'/exp OR 'anesthesiology'/exp OR 'anaesthes*':ti,ab,kw OR 'surgery'/exp OR 'surgery' OR 'perioperative':ti,ab,kw OR 'postoperative':ti,ab,kw OR 'preoperative':ti,ab,kw OR 'operati*':ti,ab,kw OR 'intraoperative':ti,ab,kw OR 'surgery':ti,ab,kw OR 'surgical':ti,ab,kw)
Pubmed:
("surgical procedures, operative"[MeSH Terms] OR "Surgery"[MeSH Subheading] OR "Perioperative"[Title/Abstract] OR "Postoperative"[Title/Abstract] OR "Preoperative"[Title/Abstract] OR "operati*"[Title/Abstract] OR "Intraoperative"[Title/Abstract] OR "Surgery"[Title/Abstract] OR "surgical"[Title/Abstract] OR ("Anesthetists"[MeSH Terms] OR "Anesthesiology"[MeSH Terms] OR "Anaesthesia"[Title/Abstract] OR "Anesthesia"[Title/Abstract] OR "Anaesthesias"[Title/Abstract] OR "Anesthesiology"[Title/Abstract] OR "Anaesthesiology"[Title/Abstract] OR "Anaesthetist"[Title/Abstract] OR "Anesthetist"[Title/Abstract] OR "anesthesia assistant*"[Title/Abstract] OR "anaesthesia assistant*"[Title/Abstract])) AND ("Hypnosis"[MeSH Terms] OR "hypnosis, anesthetic"[MeSH Terms] OR "Hypnosis"[Title/Abstract] OR "hypnotherap*"[Title/Abstract] OR "hypnoti*"[Title/Abstract] OR "self-hypnosis"[Title/Abstract] OR "self-hypnotic"[Title/Abstract] OR "Autohypnosis"[Title/Abstract] OR "hypnoa*nesthesia"[Title/Abstract] OR "hypnosedation*"[Title/Abstract])

Appendix S2- Randomized controlled trials (RCTs)

Appendix S2: Randomized controlled trials

AUTHOR	YEAR	COUNTRY	PROCEDURE	HYPNOSIS				CONTROL				PRACTITIONER	TIMING
				N	Age (years)	Sex M/F	Anaesthesia	N	Age (years)	Sex M/F	Anaesthesia		
Azam	2024	Canada	Oncology	29	56 (12)	14/15	GA	28	56 (10)	12/16	GA	Psychologist	PRE, POST
Catalano	2024	Switzerland	Neurosurgery	10	63.8 [43-73]	5/5	LA	9	62 [42-72]	8/1	LA	Anaesthesiologist	PRE, PER
Polomeni	2024	France	Mixed surgeries	47	[7-14] °	25/22	None	49	[7-14] °	23/26	LA	Hypnotherapist	PER
Rosenbloom	2024	Canada	Oncologic	45	58.26 (12)	18/21	GA	47	57 (10)	21/24	GA	Psychologist	PRE, POST
Sola	2023	France	Dermatology	30	9.5 [7-16]	17/13	GA	30	10 [7-16]	11/19	GA	Anaesthesiologist/ Nurse	PRE, PER
Courtois	2022	France	Lumbar puncture	25	77 (5)	10/15	LA	25	77 (5)	38/12	LA	Psychologist	PER
Markovits	2022	USA	Orthopaedic	31	70.6 [48 -87	11/20	GA	33	65 [42-92]	16/17	GA	nr	PRE
Meyer	2022	USA	Gynaecology	71	54 (40.6)	0/71	SC	67	61 (47)	0/67	SC	Recording	PRE
Michel	2022	France	Thoracic	40	42 (26)	27/13	GA	38	42.5 (23)	19/19	GA	Anaesthesiologist	PRE
Moreno	2022	Mexico	Breast surgery	20	nr [30-80]	0/20	GA	20	nr [30-80]	0/20	GA	Recording	PRE, POST
Portel	2022	France	Endoscopy	30	65 (13)	17/13	LA	28	62 (12)	24/6	LA	Nurse	PER
Rousseaux	2022	Belgium	Cardiac related	25	68 (12)	18/7	GA	25	63 (11)	18/7	GA	Recording	PRE, POST
Viegas	2022	Canada	Cardiac related	39	13 [11-15]	18/21	GA	39	13 [11-15]	19/20	GA	Script	PRE, PER
Sourzac	2021	France	Gynaecology	14	63 (nr)°	0/14	GA	15	63 (nr)°	0/15	GA	Nurse	PRE
Tezcan	2021	Turkey	Urology	45	64.5 (7.5)	45/0	LA	45	64 (7)	45/0	LA	nr	PRE, PER
Fusco	2020	France	Venipuncture	89	56 [28-89]	41/48	None	92	54 [18-86]	44/48	None	Anaesthesiologist/ Nurse	PER
Garcia*	2020	France	Cardiac related	56	70 (12)	43/13	LA	57	70 (12)	46/11	LA	Nurse	PER
Innayatun	2020	Indonesia	Gynaecology	30	nr	0/30	LR	30	nr	0/30	LR	nr	PRE
Nowak	2020	Germany	Mixed surgeries	191	52 [43-62]	76/115	GA	194	54 [46-62]	84/110	GA	Recording	PER
Efsun	2019	Turkey	ENT	11	26 (5.2)	6/5	GA	11	26 (10)	6/5	GA	Anaesthesiologist	PRE
Hoslin	2019	France	Venipuncture	77	61 (13)	28/49	LA	71	57 (14)	27/44	LA	nr	PRE, PER
Lee	2019	Malaysia	Orthopaedic	8	66 (9.3)	01.Jul	GA	8	68 (10.4)	0/8	GA	Recording	PRE, POST
Sánchez	2019	Mexico	Breast surgery	58	48 (10)	0/58	LA	57	48 (12)	0/57	LA	Recording	PRE
Amraoui	2018	France	Breast surgery	77	53 [20-84]	0/77	GA	71	57 [33-79]	0/71	GA	Anaesthesiologist	PRE
Bataille	2018	France	Gynaecology	31	41 [37-46]	0/31	GA	34	42 [38-45]	0/34	GA	Anaesthesiologist/ Nurse	PER
Chen	2018	China	Ophthalmology	55	64 (5.7)	25/30	LA	56	65 (5)	27/29	LA	nr	PRE
Duparc-Alegria	2018	France	Orthopaedic	59	15 [10-18]	19/40	GA +/- LR	59	15 [13-16]	15/44	GA +/- LR	Nurse	PER
Akgul	2016	Turkey	Cardiac related	22	54 (10)	17/5	GA	22	55 (9)	18/4	GA	Anaesthesiologist	PRE
Behnaz	2016	Iran	Ophthalmology	45	nr [50 to 75]	47/43°	LA	45	nr [50 to 75]'	47/43°	LA + AS	Psychologist	PER
Corman	2016	France	TOE	47	60 (15)	31/16	LA	51	55 (14)	29/22	LA	Psychologist	PRE
Dogan	2016	Turkey	TOE	27	39 (9.2)	11/16	LA	49	35 (13)	26/23	LA + sedation	Anaesthesiologist	PRE, PER
Joudi	2016	Iran	Visceral	60	43 (9.4)	nr	GA	60	43 (14)	nr	GA	Recording	PRE
Hizli	2015	Turkey	Urology	32	63.5 (6)	32/0	None	32	62 (7)	32/0	None	Hypnotherapist	PRE
Catoire	2013	France	Venipuncture	50	30 (3.6)	0/50	None	43	32 (3.5)	0/43	Sedation	nr	PER
Shenefelt	2013	USA	Dermatology	13	59 [23-75]	7/6	nr	13	66 [48-76]	7/5	nr	Nurse	PER
Reinhard	2012	Germany	Gynaecology	78	31 (4.4)	0/78	None	122	32.5 (5)	0/122	None	Obstetrician	PER
Liossi	2009	UK	Venipuncture	15	8.4 (2)	6/9	LA	15	8.4 (2)	8/7	LA	Hypnotherapist	PRE
Lang	2008	USA	Percutaneous	66	48 [33-75]	21/45	LA	70	50.5 [29-79]	31/39	LA	Self-hypnosis	PER
Marc	2008	Canada	Gynaecology	172	26 (6)	0/172	Sedation	175	24 (5)	0/175	Sedation	nr	PRE, PER
Schnur	2008	USA	Breast surgery	49	46 (2)	0/49	GA	41	45 (2)	0/41	GA	Psychologist	PRE
Marc	2007	Canada	Gynaecology	14	27 (7.2)	0/14	None	15	26 (5)	0/15	Nitrous oxide	nr	PRE, PER
Montgomery	2007	USA	Breast surgery	105	49 (13)	0/105	LA + AS	95	48 (13)	0/95	LA + AS	Psychologist	PRE
Liossi	2006	UK	Lumbar puncture	15	nr [6-16]	nr	LA	15	nr [6-16]	nr	LA	Psychologist	PRE
Saadat	2006	USA	Mixed surgeries	26	42 (10)	18/8	nr	24	43 (10)	19.May	nr	nr	PRE
Calipel	2005	France	Mixed surgeries	23	4.5 [2-10]	19/4	None	27	5 [2-11]	21/6	Sedation	Anaesthesiologist	PRE, PER
Cowan	2001	USA	Visceral	10	37 (nr)	2/8	GA	17	36 (nr)	0/17	GA	Recording	PER, POST
Defechereux	2000	Belgium	Parathyroid/thyroid surgery	20	46 (12)	1/19	AS	20	45 (15)	4/16	GA	Anaesthesiologist	PER
Lang	2000	USA	Percutaneous	66	48 [33-75]	21/45	LA	70	50.5 [29-79]	31/39	LA	Self-hypnosis	PRE, PER, POST
Conlong	1999	UK	Endoscopy	33	58 [19-92]	nr	LA	46	58 [19-92]	nr	LA	Gastroenterologist	PER
Ashton	1997	USA	Cardiac related	20	64 (3)	17/3	GA	12	62 (3)	11/1	GA	Self-hypnosis	PRE, POST
Enqvist	1997	Sweden	Breast surgery	23	39 [22-63]	0/23	GA	25	41.5 [24-69]	0/25	GA	Recording	PRE
Faymonville	1997	Belgium	Plastic	31	36 (14)	3/29	LA + AS	25	34 (10)	4/21	LA + AS	Anaesthesiologist	PER
Lang	1996	USA	Radiology	16	69 [54-83]	16/0	Sedation	14	64 [44-78]	14/0	Sedation	nr	PRE, PER
Williams	1994	UK	Gynaecology	22	nr	0/22	GA	29	nr	0/29	GA	Recording	PER
Greenleaf°°	1992	USA	Cardiac related	nr	nr	nr	GA	nr	nr	nr	GA	Psychologist	PRE, POST
Weinstein	1991	USA	Cardiac related	16	60 (8)	nr	LA	16	59 (11)	nr	LA	Hypnotherapist	PRE, PER
Goldmann	1988	UK	Gynaecology	25	nr	0/25	LA	27	nr	0/27	LA	nr	PRE
Hart	1980	USA	Cardiac related	20	nr	16/4	nr	20	nr	17/3	nr	Recording	PRE
Field §	1974	USA	Orthopaedic	30	nr	nr	nr	30	nr	nr	nr	Recording	PRE

Age is reported as mean (SD) or [range]; M: Male; F: Female; nr: not reported. AS: analgosedation; SC: standard care; LA: local anesthesia; GA: general anesthesia; PRE: preoperative; PER: peroperative; POST: postoperative; ENT: Ear Nose Throat; TEE: Trans-esophageal echography; *Garcia 2020: white noise and suggestions were added to LA in the control group; °: the value is reported for the entire sample; °°Greenleaf 1992: 32 patients were randomized in 3 groups. The number of included patients per groups are not reported. The mean (sd) age of the sample was 59 (9) and the male/female ratio was 26/6. §Field 1974: the male/female ratio was only reported for the entire sample (58/2).

Appendix S3- Non-randomized controlled studies (NRCS)

Appendix S3: Non-randomized controlled studies (NRCS)

AUTHOR	COUNTRY	PROCEDURE	DESIGN	HYPNOSIS				CONTROL				PRACTITIONER	TIMING
				N	Age (years)	Sex M/F	Anaesthesia	N	Age (years)	Sex M/F	Anaesthesia		
Berlière	Belgium	Breast surgery	non randomized trial	95	60 [34-86]	0/95	LA + AS	93	62 [28-83]	0/93	GA	Anaesthesiologist	PER
Cossu	Switzerland	Neurosurgery	controlled cohort	14	43 (9)	7/12	LA + AS	8	50 (11)	4/4	GA	Hypnotherapist	PER
Derycke	France	Cardiac related	controlled cohort	28	70 (10.5)	28/0	AS	43	75 (8)	38/5	GA	Anaesthesiologist	PER
Bankole	France	Neurosurgery	controlled cohort	26	41.5 (12)	11/15	LA	35	41.5 (12)	19/16	Sedation	Anaesthesiologist	PRE, PER
Loseto°	France	Percutaneous	non randomized trial	21	59 (nr)°	nr	LA	10	59 (nr)°	nr	LA	Nurse	PER
Badidi	France	Cervical endocrin	controlled cohort	50	50 (nr)	15/35	LA + AS	50	50 (nr)	15/35	GA	Anaesthesiologist/ Nurse	PRE, PER
Juana María	Spain	Dermatological	non randomized trial	33	8 (2)	nr	Sedation	32	8 (3)	nr	Sedation	Anaesthesiologist	PRE
Scaglione	Italy	Cardiac related	non randomized trial	11	57 (12)	9/2	LA+ AS	19	53 (14)	13/6	LA+ AS	Nurse	PER
Pesce	Italy	Neurosurgery	controlled cohort	6	52 [22-72]	nr	LR	9	54 [34-71]	nr	LR + Sedation	nr	PER
Takahashi	France	Cardiac related	controlled cohort	36	85 (7)	15/21	LA + Sedation	107	84 (7)	51/56	LA + Sedation	nr	PER
Touzé	France	Cervical endocrin	controlled cohort	19	61 (nr)	10/9	LA + Analgesic	17	64 (nr)	6/14	LA + AS	Anaesthesiologist/ Nurse	PER
Chapet	France	Urologic	controlled cohort	68	66 (6)	68/0	LA	79	66 (6)	79/0	GA or AS	Anaesthesiologist	PER
Lacroix	France	Breast surgery	non randomized trial	21	60 [36-79]	0/21	LR + AS	21	58 [39-75]	0/21	LR+ GA	Anaesthesiologist	PER
Berlière	Belgium	Breast surgery	non randomized trial	150	59.5 (nr)	0/150	AS	150	58 (nr)	0/150	GA	Anaesthesiologist	PER
Boselli	France	Orthopaedic	non randomized trial	50	48 [33-53]	21/29	LR	50	34 [30-50]	20/30	SC	Anaesthesiologist	PRE
Manworren	USA	Thoracic	controlled cohort	24	15 (2)	22/2	GA + IV LA or Th. EP	29	15 (2)	25/4	GA + IV LA or	Self-hypnosis	PRE, POST
Zech	Germany	Neurosurgery	controlled cohort	64	62 (7.6)	46/18	LA+ AS	22	63 (7.6)	14/8	GA	Anaesthesiologist	PER
Agard	France	Ophthalmologic	non randomized trial	102	74.5 (7)	nr	LA	69	73 (7)	nr	LA	Nurse	PRE, PER
Romain	France	Visceral	controlled cohort	35	60 [27-81]	31/4	LR	55	60 [21-85]	51/4	LR or LR + GA	Nurse	PER
Zemmoura	France	Neurosurgery	controlled cohort	37	41 [18-67]°	19/18	LA + AS	33	41 [18-67]°	nr	GA	Anaesthesiologist	PRE, PER
Eren	Turkey	TEE	non randomized trial	45	39 (13.7)	20/25	None	41	36 (14)	21/20	Sedation	Anaesthesiologist	PRE, PER
Coveney	UK	Breast surgery	controlled cohort	39	nr	0/39	GA	38	nr	0/38	GA	nr	PRE
Gauchotte	France	Gynaecologic	controlled cohort	30	nr	0/30	None	40	nr	0/40	None	Nurse	PER
Lew	USA	Breast surgery	non randomized trial	20	nr [30-79]	0/20	GA	18	nr [30-79]	0/18	GA	Hypnotherapist	PRE
Musellec	France	Gynaecologic	controlled cohort	12	39 (3)	0/12	AS	12	41 (3.5)	0/12	GA	Anaesthesiologist	PER
Novoa	USA	Cardiac related	non randomized trial	50	67 (10)	36/14	GA	50	66 (9.6)	36/14	GA	Surgeon	PRE
Bouté	France	Breast surgery	non randomized trial	14	nr	0/14	LA	14	nr	0/14	LA	Anaesthesiologist	PER
Levitas	Israel	Gynaecologic	controlled cohort	89	32 (4)	0/89	SC	96	32 (5)	0/96	SC	nr	PRE, PER
Elkins	USA	Endoscopy	controlled cohort	6	58 (6.2)	5/1	AS	10	56 (7.2)	3/7	AS	Recording	PER
Lobe	USA	Thoracic	non randomized trial	5	nr [12-18]°	nr	GA + PCA	5	nr [12-18]°	nr	GA + Th.EP	Self-hypnosis	PRE, POST
Defechereux	Belgium	Cervical endocrin	non randomized trial	218	48.5 (nr)	49/169	AS	119	59.5 (nr)	27/92	GA	Anaesthesiologist	PRE,PER,POST
Enqvist	Sweden	ENT	non randomized trial	45	24 (8.3)	12/33	GA	45	23 (7)	24/21	GA	Recording	PRE, PER
Faymonville	Belgium	Plastic surgery	non randomized trial	172	36 (18)	50/122	AS	137	39 (15)	35/102	AS	Anaesthesiologist	PER

Age is reported as mean (SD) or [range]; M: Male; F: Female; nr: not reported. AS: analgosedation; SC: standard care; LA: local anesthesia; LR: locoregional; GA: general anesthesia; Th. EP: Thoracic epidrual; PCA: Patient controlled analgesia; PRE: preoperative; PER: peroperative; POST: postoperative; °: the age was reported for the entire sample.

Appendix S4- Uncontrolled studies of more than one patient

Appendix S4: Uncontrolled studies of more than one patient

AUTHOR	YEAR	COUNTRY	PROCEDURE	HYPNOSIS				PRACTITIONER	TIMING
				N	Age (years)	Sex M/F	Anaesthesia		
Bobin	2023	France	Endoscopy	23	51 (11.7)	16/7	None	nr	PRE, PER
Fontanges	2023	France	Cardiac related	16	10.5 [4-16]	nr	LA	nr	PER
Chandrasegaran	2022	Malaysia	Ophtalmology	2	34-55	1/1	LA	Anaesthesiologist	PER
Wood	2022	France	Neurosurgery	74	54 (12.5)	39/35	LA	Hypnotherapist	PRE, PER
Lind	2021	Norway	Breast surgery	5	nr [40-70]	0/5	GA	Hypnotherapist	PRE
Lopes	2021	France	Neurosurgery	46	54 [23-85]	24/22	GA	Nurse	PRE
Tran	2021	France	Endoscopy	140	12 [9-14]	70/70	Sedation	Nurse	PRE
Jaouen	2020	France	ENT	51	63 [22-87]	14/37	LA + Analgesic	Anaesthesiologist/ Nurse	PRE, PER
Kissel	2020	France	Percutaneous	20	59 [36-80]	0/20	LA + Sedation	Radiation therapist	PER
Amedro	2019	France	TOE	16	nr [11-18]	9/7	None or GA or AS	Hypnotherapist	PER
Fathi	2019	Iran	Orthopaedic	2	33.5 (nr)	1/1	LA	Anaesthesiologist	PER
Barbero	2018	Italy	Cardiac related	5	nr	2/3	LA	Nurse	PER
Sterkers	2018	France	Venipuncture	30	54 [35-77]	0/30	LA+AS	Recording	PRE, PER
Claude	2016	France	Radiotherapy	132	3 [0.4-5]	74/58	GA	nr	PRE, PER
Bouzinac	2012	France	Breast surgery	3	nr	0/3	LA+ Analgesic	Anaesthesiologist	PER
Galy	2012	France	Cardiac related	150	70 (nr)	107/43	LR	Anaesthesiologist	PER
Dominguez	2010	Spain	Endoscopy	26	nr [20-67]	14/12	None	nr	PRE, PER
Hermes	2005	Germany	ENT	209	nr [13-87]	nr	LA	Recording	PRE, PER
Séfiani	2004	France	Visceral	50	52 (64)	3/47	LA+ AS	Anaesthesiologist	PER
Bertoni	1999	Italy	Radiotherapy	3	nr [4-5]	2/1	None	Psychotherapist	PRE, PER
Adams	1992	Canada	Percutaneous	2	19-44	0/2	None or LA	Psychotherapist	PRE, PER
Alvin	1976	USA	Orthopaedic	18	nr [12-22]	3/15	GA	Anaesthesiologist	PER

Age is reported as mean (SD) or [range]; M: Male; F: Female; nr: not reported. AS: analgosedation; LA: local anaesthesia; LR: locoregional; GA: general anaesthesia; TEE: Trans-oesophageal echography; ENT: Ear Nose Throat; PRE: pre-intervention; PER: per-intervention; POST: post-intervention.

Appendix S5- Case reports

Appendix S5: Case reports

AUTHOR	YEAR	COUNTRY	PROCEDURE	HYPNOSIS			PRACTITIONER	TIMING
				Age (years)	Sex M/F	Anaesthesia		
Bapteste	2023	France	Neurosurgery	12	M	Sedation	nr	PRE, PER
Oung	2023	Switzerland	Parathyroid/thyroid surgery	60	F	Analgesic	Anaesthesiologist	PRE, PER
Chandrasegaran	2022	Malaysia	Orthopaedic	44	M	LR	Anaesthesiologist	PER
Pilia	2022	Italy	Visceral	56	M	GA	Anaesthesiologist	PRE, PER
Fathi	2021	Iran	Ophthalmology	54	F	None	Anaesthesiologist	PER
Vanreusel	2021	Belgium	Cardiac related	66	F	LA	nr	PER
Makovac	2020	Switzerland	Parathyroid/thyroid surgery	33	M	LA+ Analgesic	Anaesthesiologist	PER
Ibañez del Prado	2019	Spain	Venipuncture	52	M	Sedation	Hypnotherapist	PRE, PER
Al-Nasser	2018	France	Parathyroid/thyroid surgery	76	M	LA	Anaesthesiologist	PER
Cholet	2017	France	Cardiac related	67	M	LA+ Analgesic	Anaesthesiologist	PER
Fathi	2017	Iran	Gynaecology	51	F	None	Anaesthesiologist	PER
Fuzier	2017	France	Breast surgery	58	F	LA+ Analgesic	Nurse	PRE, PER
Fiddaman	2016	UK	Breast surgery	85	F	LA	Hypnotherapist	PRE, PER
Bienvenu	2015	France	Orthopaedic	20	F	GA	Hypnotherapist	PRE. PER. POST
Antonelli	2014	Italy	mixed surgeries	35	M	GA	Anaesthesiologist	PRE, PER
Facco	2013	Italy	Dermatology	42	F	None	nr	PRE, PER
Wong	2011	Australia	Gynaecology	34	F	Analgesic	nr	PRE, PER
Kiss	2011	France	Ophthalmology	73	M	LA	nr	PRE, PER, POST
O'Shea	2011	UK	Orthopaedic	62	M	None	Self-hypnosis	PER
Von Ungern	2009	Australia	Venipuncture	13	M	LA	Anaesthesiologist	PER
Cyna	2007	Australia	Venipuncture	5	M	None	Self-hypnosis	PRE, PER
Mackenzie	2007	Australia	mixed surgeries	6	M	GA	Anaesthesiologist	PRE
Burkle	2005	USA	Breast surgery	67	F	LA	Self-hypnosis	PER
Wain	2004	USA	ENT	31	M	None	Anaesthesiologist	PRE, PER
Simon	2001	USA	Lumbar puncture	61	F	LA	Hypnotherapist	PRE, PER
Botta	1999	USA	Plastic	NS	M	None	Self-hypnosis	PER
Finer	1973	Sweden	Percutaneous	nr	F	None	nr	PER
Mason	1955	UK	Breast surgery	24	F	None	Anaesthesiologist	PER

M: Male; F: Female; nr: not reported; LA: local anaesthesia; LR: locoregional; GA: general anaesthesia; ENT: Ear Nose Throat; PRE: pre-intervention; PER: per-intervention; POST: post-intervention.

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Appendix S7- Analyses Including NRCS Data

Appendix S7: Separate Analyses Including NRCS Data

	Timing of hypnosis administration								
	Pre-intervention (22RCTs & 6 NRCSs)			Per-intervention (28 RCTs & 24 NRCSs)			Post-intervention (9RCTs & 3 NRCSs)		
	RCT/NRCS # studies	# patients	Estimate with 95%CI	RCT/NRCS # studies	# patients	Estimate with 95%CI	RCT/NRCS # studies	# patients	Estimate with 95%CI
Primary outcomes									
Propofol (mg)	2/1	348/65	**-25.2 (-31.9 to -18.6)**	1/3	65/259	**-112.3 (-186.6 to -38.0)**			nr
Any opioid, during the intervention	3/0	266/0	-0.64 (-1.40 to 0.13)*	1/3	113/215	-1.61 (-3.47 to 0.26)*			nr
No need for analgosedation (yes/no)				2/1	377/16	**3.13 [1.77 to 5.55]**			nr
Secondary outcomes									
Pain intensity during the intervention (VAS cm)				6/2	811/100	**-1.50 (-2.54 to -0.46)**			nr
Pain intensity after the intervention (VAS cm)	7/2	419/142	**-0.94 (-1.54 to -0.35)**	7/2	927/278	**-0.61 (-1.03 to -0.20)**	2/1	108/337	0.02 (-0.88 to 0.92)
Need for class I-II analgesic (yes/no)	3/1	212/65	**0.43 [0.19 to 0.97]**	1/2	77/258	0.24 [0.04 to 1.29]	0/0	0/0	--
Need for class III analgesic (yes/no)				4/1	340/36	0.71 [0.48 to 1.05]	1/0	50/0	
Anxiety during the intervention (score)				2/1	377/30	-0.47 (-1.20 to 0.26)	1/0	113/0	nr
Anxiety after the intervention (score)	**8/0**	**515**	**-0.76 (-1.14 to -0.38)***	8/3	963/296	**-0.72 (-1.25 to -0.19)***	0/0	0/0	--
Patient satisfaction (VAS cm)				4/2	465/176	0.21 (-0.34 to 0.75)	0/1	337	
Medical team satisfaction (VAS cm)			--	2/2	146/176	1.10 (0.52 to 1.68)	0/0	0/0	nr
Complications (yes/no)				1/6	78/665	0.78 [0.53 to 1.12]	1/1	32/337	
PONV (yes/no)				3/4	185/745	**0.25 [0.13 to 0.49]**	0/0	0/0	--
Procedure duration (min)				7/10	1134/644	-0.56 (-2.26 to 1.15)	0/1	0/337	
Time in PACU (min)	2/1	348/65	**-13.4 (-20.4 to -6.50)**	2/2	137/218	**-47.4 (-66.0 to -28.8)**	0/0	0/0	--
Hospital stay (day)				1/2	59/161	-0.42 (-1.04 to 0.19)	1/1	32/337	

Estimates are reported as WMD(95%CI), SMD(95%CI)*, RR[95%CI].nr: not relevant. In bold: statistically significant results. RCT: randomized controlled trials; NRCS: non-randomized controlled studies; # studies: number of included studies reporting on the outcome; # patients: number of patients in studies reporting on the outcome; Analyses were not performed if fewer than 3 studies reported on a given outcome.

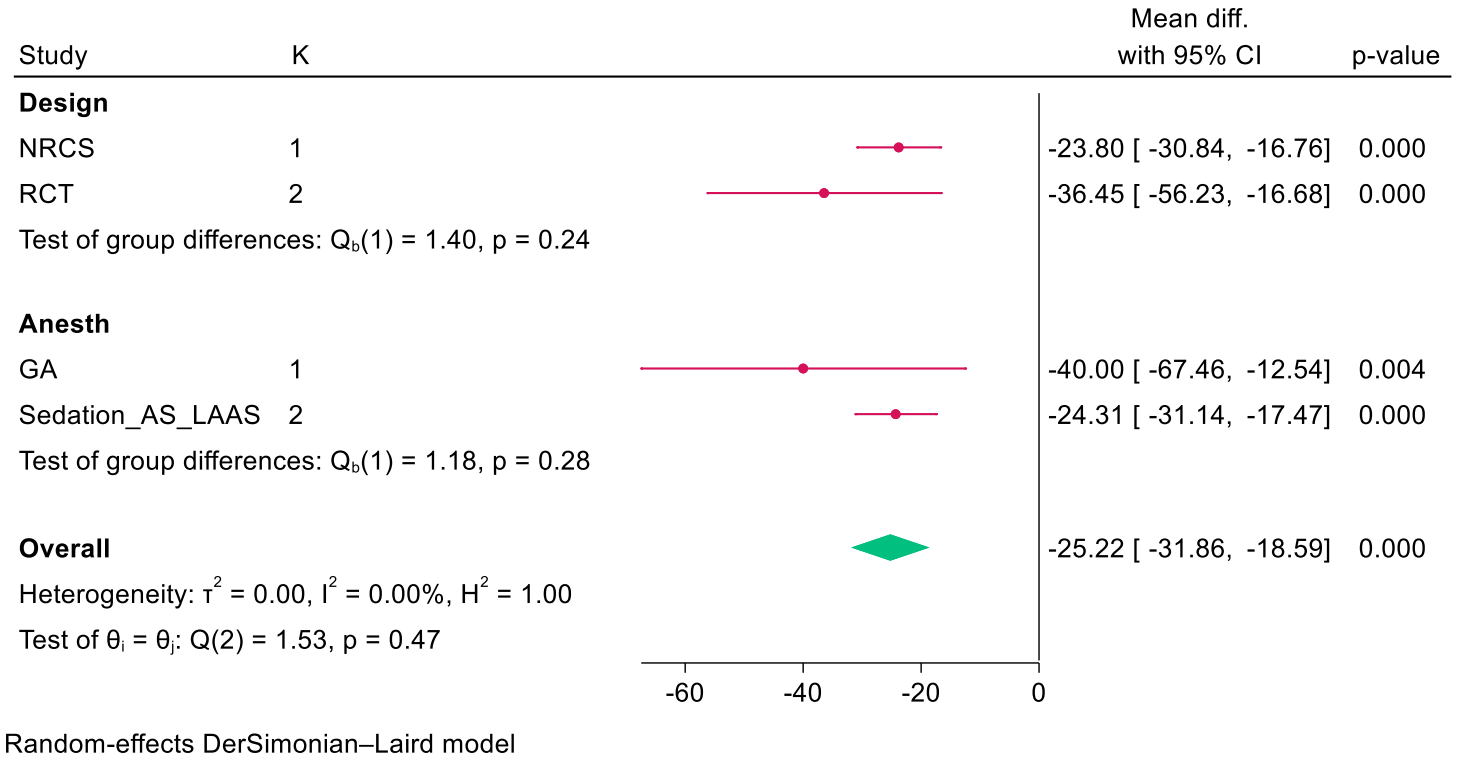
Appendix S8

Figures of quantitative analyses

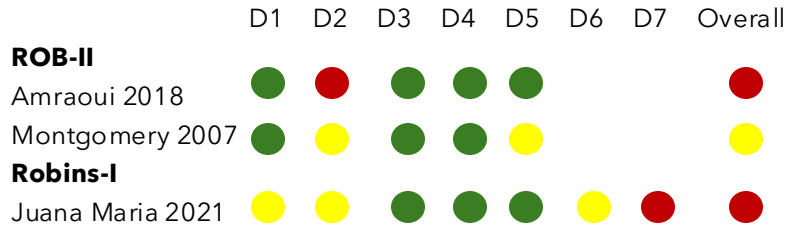
Pre-intervention hypnosis

Pre-intervention hypnosis

Propofol consumption (mg)



NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials;
Anesth: type of anaesthesia; GA: General Anaesthesia; AS: Analgosedation;
LAAS: Local anaesthesia with analgosedation



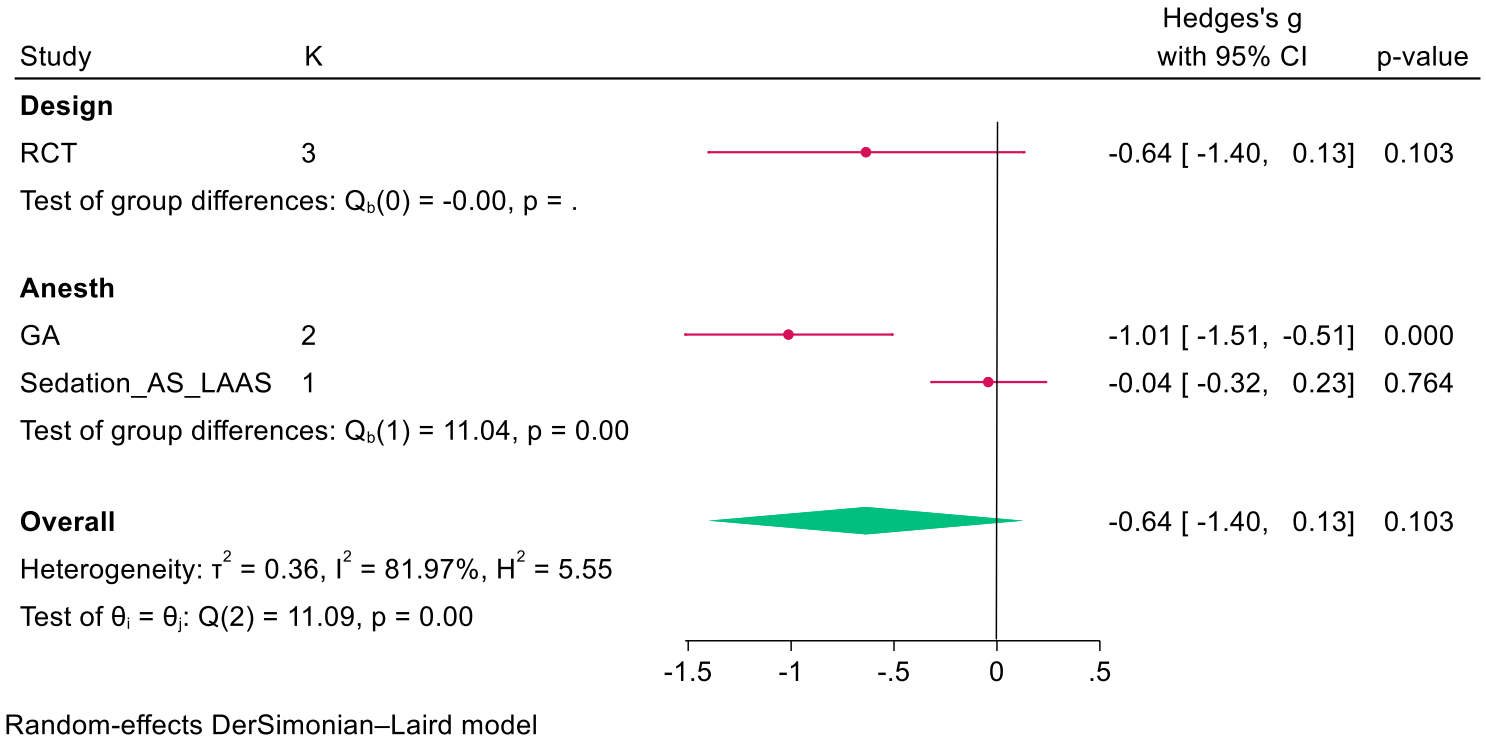
ROB-II : D1-Bias arising from the randomisation process; D2-Bias due to deviations from intended intervention; D3-Bias due to missing outcome data; D4-Bias in Measurement of the outcome; D5- Bias in the selection of the reported results

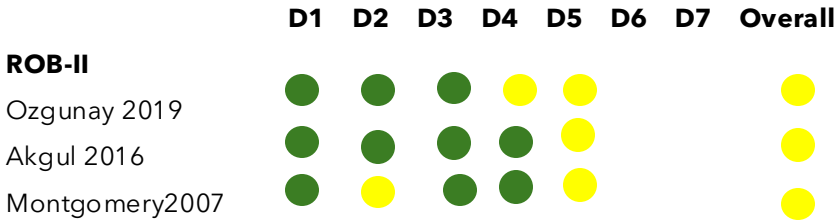
Robins-I: D1-Bais due to confounding; D2-Bias due to selection of participants; D3-Bias in classification of interventions; D4- Bias due to deviations from intended intervention; D5- Bias due to missing data; D6- Bias due to measurement of outcomes; D7- Bias in the selection of the reported results

Risk of Bias: High Some concern Low

Pre-intervention hypnosis

Any opioid, during the intervention





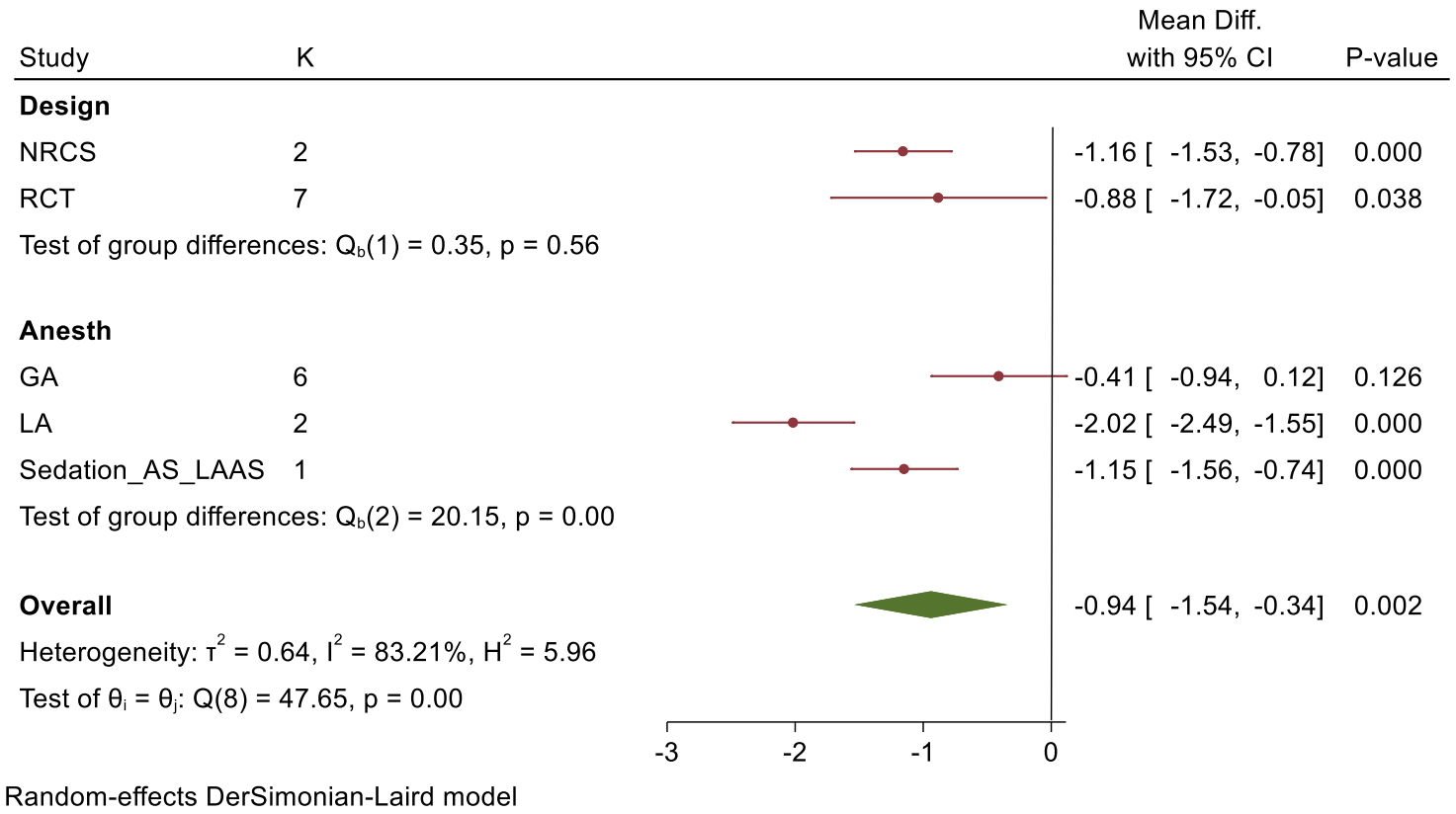
ROB-II : D1-Bias arising from the randomisation process; D2-Bias due to deviations from intended intervention; D3-Bias due to missing outcome data; D4-Bias in Measurement of the outcome; D5- Bias in the selection of the reported results

Risk of Bias: High Some concern Low

RCT: Randomized controlled trials; Anesth: type of anaesthesia; GA: General Anaesthesia; AS: Analgosedation; LAAS: Local anaesthesia with analgosedation

Pre-intervention hypnosis

Pain intensity after the intervention (VAS cm)



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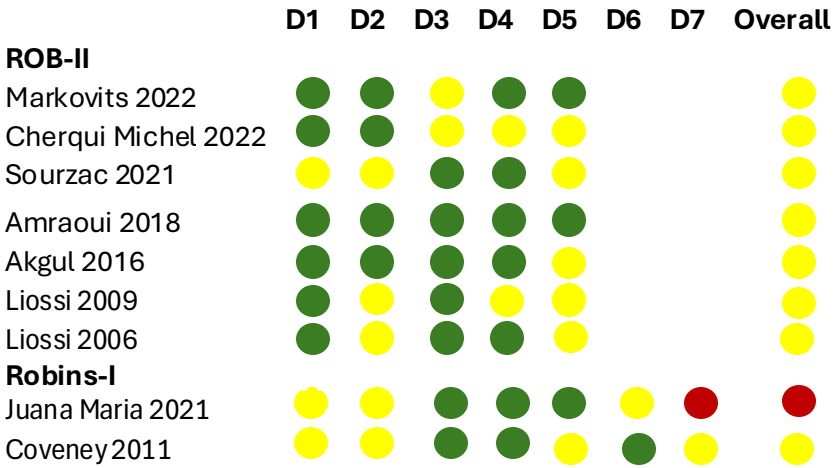
Anesth: type of anaesthesia; GA: General Anaesthesia; LA: Local anaesthesia;
AS: Analgosedation; LAAS: Local anaesthesia with analgosedation



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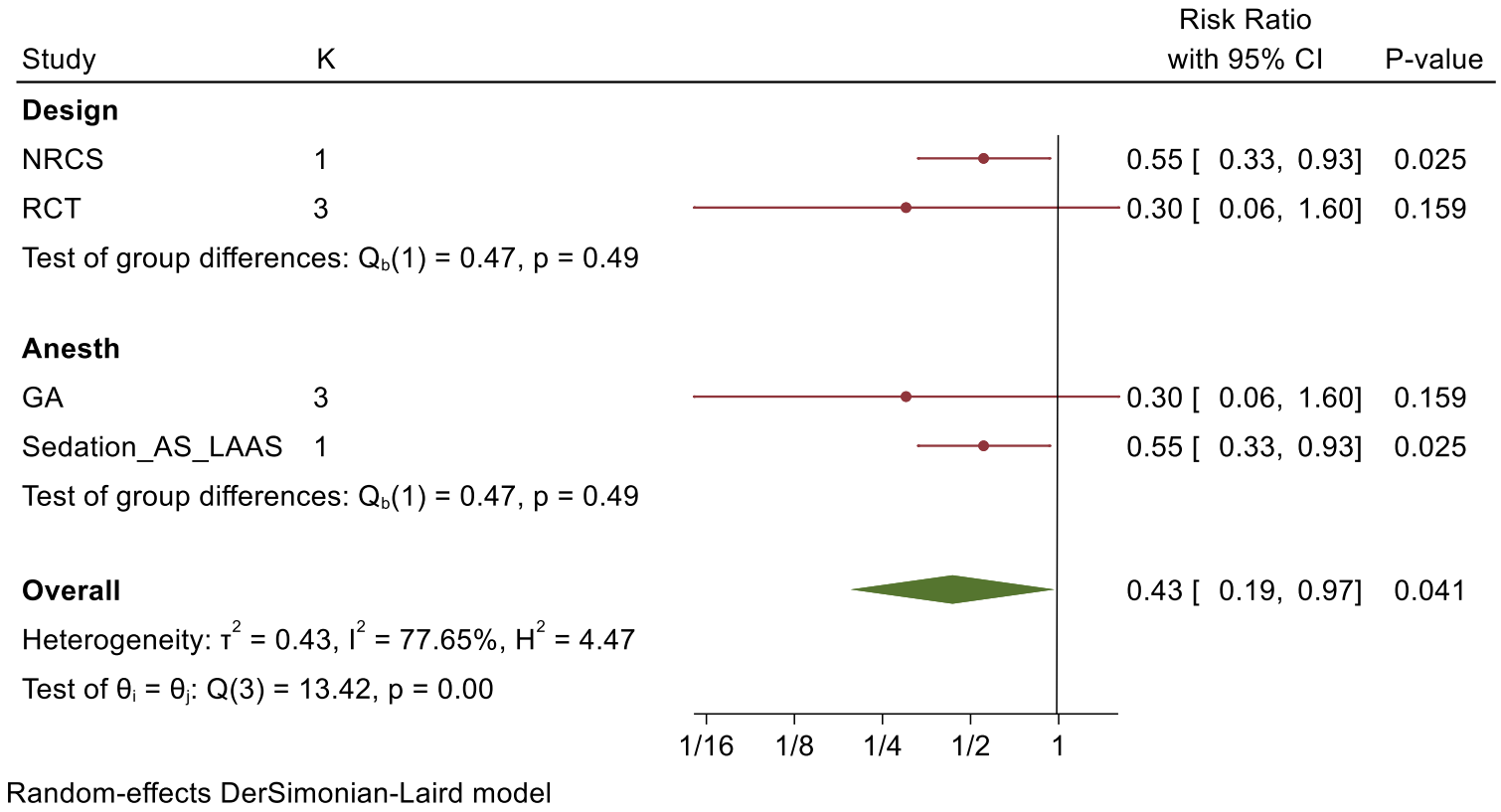
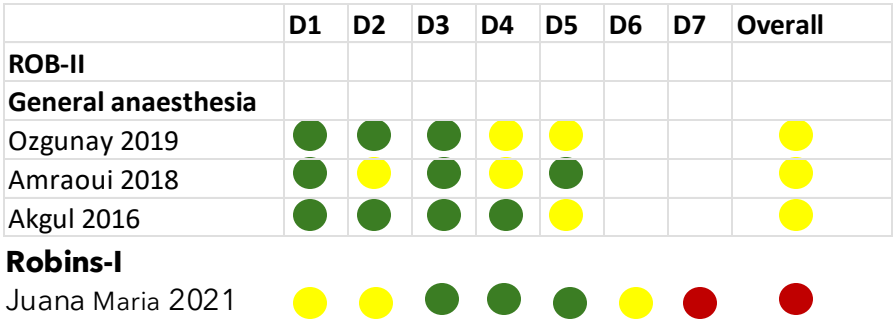
Risk of Bias: High Some concern Low

Pre-intervention hypnosis

Need for class I-II analgesic



NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials; Anesth: type of anaesthesia; GA: General Anaesthesia; AS: Analgosedation; LAAS: Local anaesthesia with analgosedation



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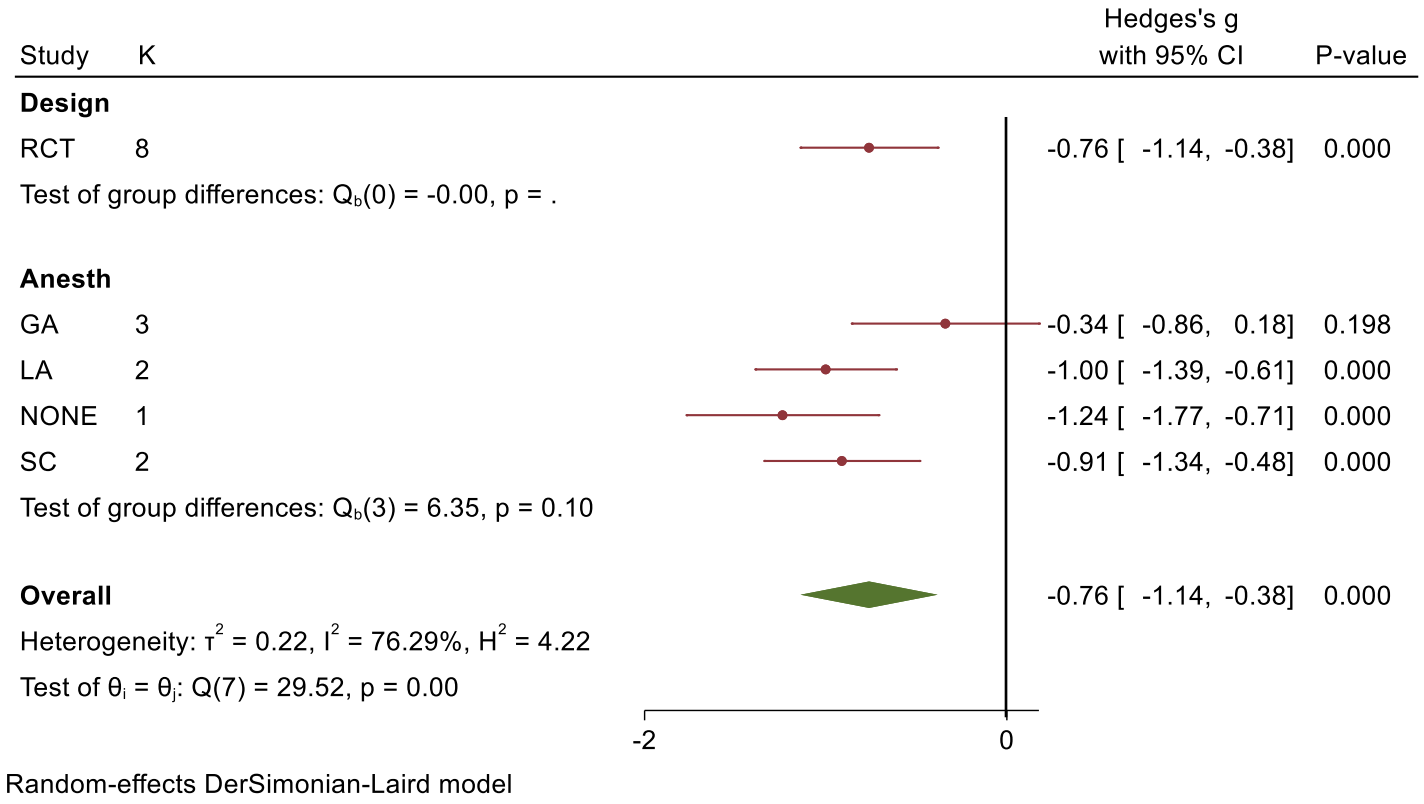
Risk of Bias: High Some concern Low

Pre-intervention hypnosis

Anxiety after the intervention (score)



ROB-II : D1-Bias arising from the randomisation process; D2-Bias due to deviations from intended intervention; D3-Bias due to missing outcome data; D4-Bias in Measurement of the outcome; D5- Bias in the selection of the reported results

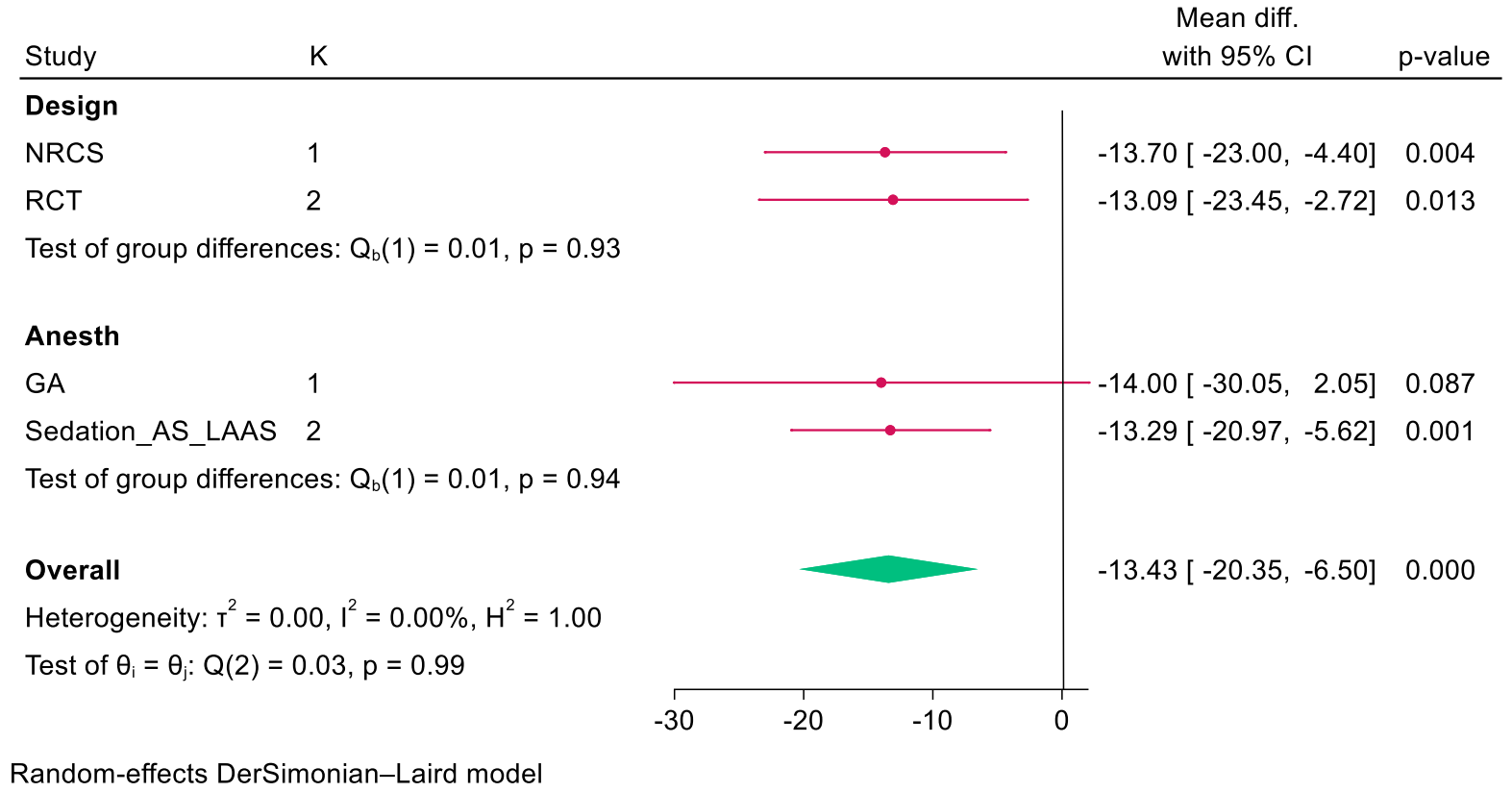
Risk of Bias: High Some concern Low

RCT: Randomized controlled trials; Anesth: type of anaesthesia; GA: General Anaesthesia; LA: Local anaesthesia: NONE: no anaesthesia; SC: standard care

*excluded due to an outcome that was markedly different.

Pre-intervention hypnosis

Time in PACU (min)



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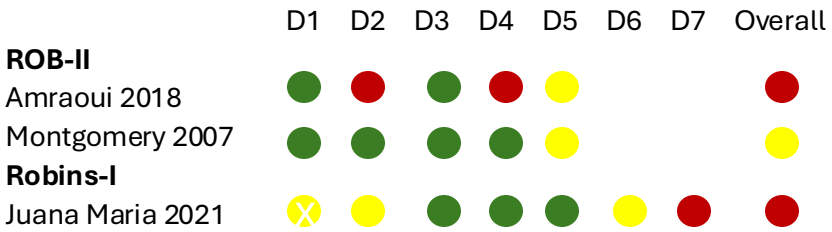

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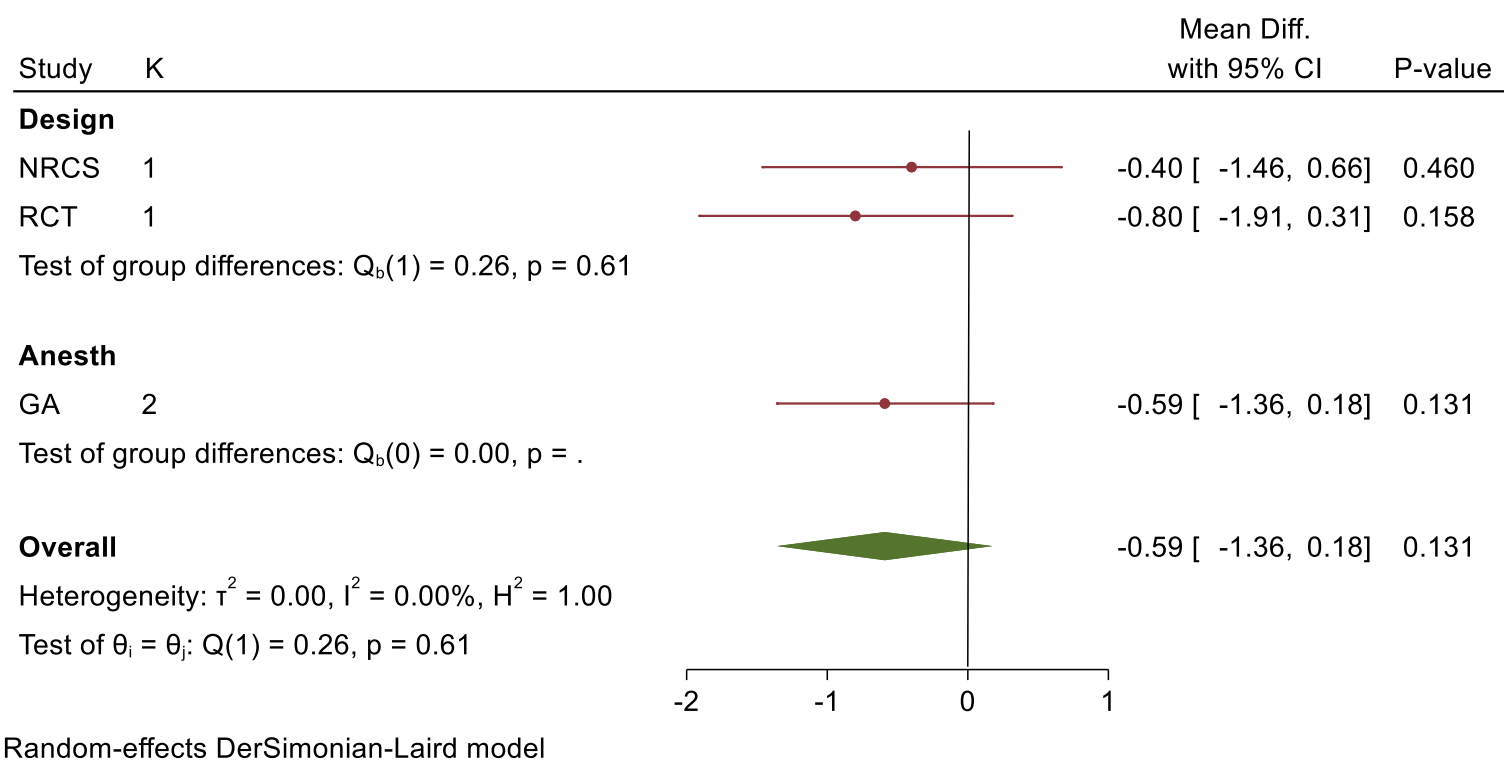
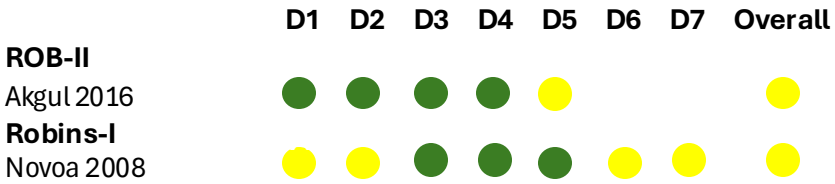
Risk of Bias: High Some concern Low

Pre-intervention hypnosis

Hospital stay (days)





ROB-II : D1-Bias arising from the randomisation process; D2-Bias due to deviations from intended intervention; D3-Bias due to missing outcome data; D4-Bias in Measurement of the outcome; D5- Bias in the selection of the reported results

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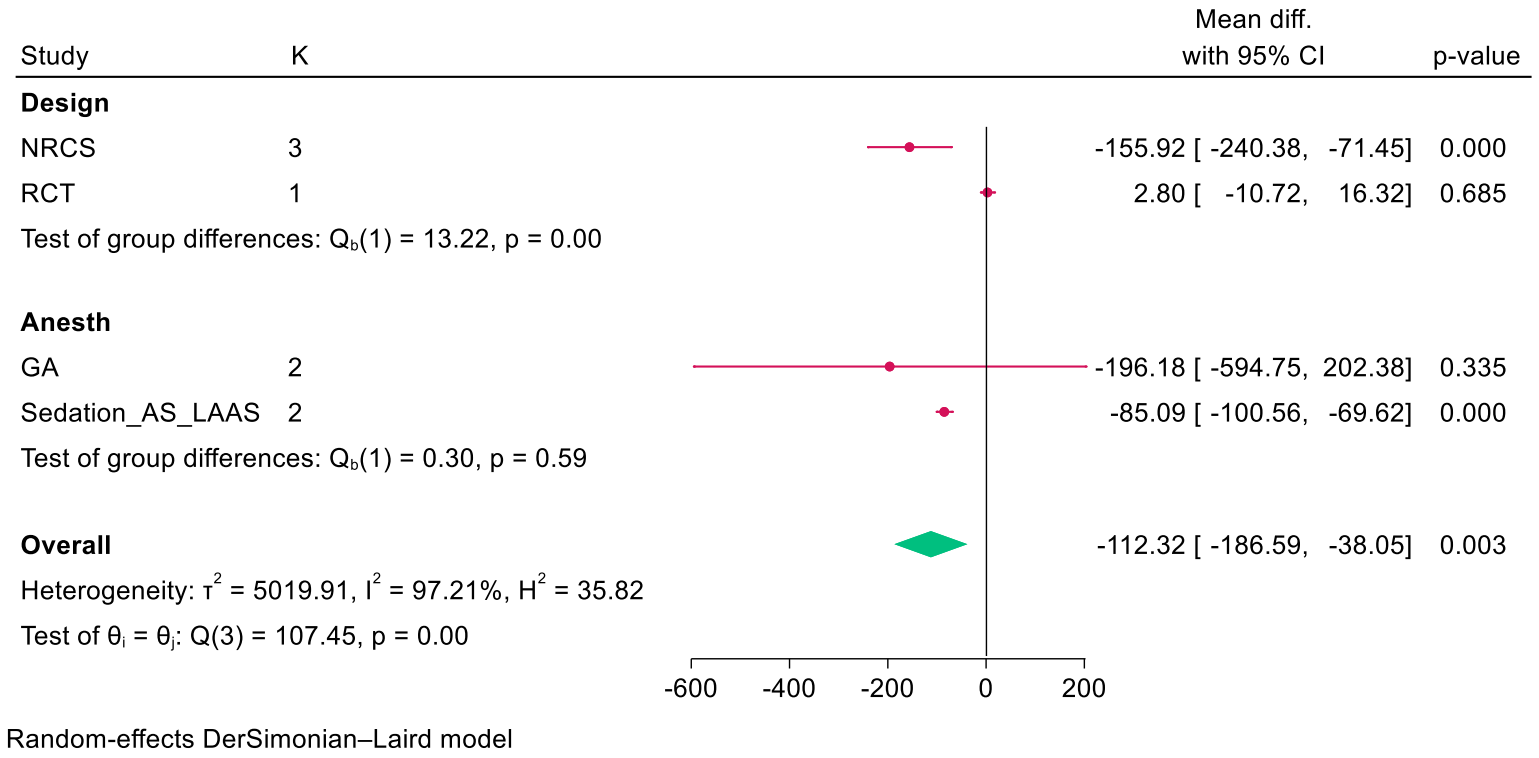
Risk of Bias: High Some concern Low

NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials;
Anesth: type of anaesthesia; GA: General Anaesthesia

Per-intervention hypnosis

Per-intervention hypnosis

Propofol consumption (mg)



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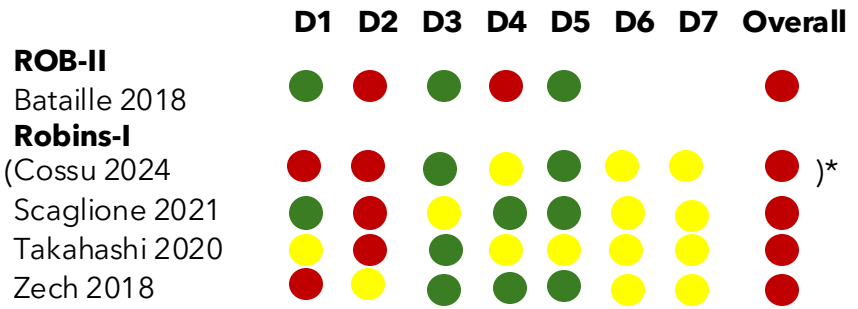

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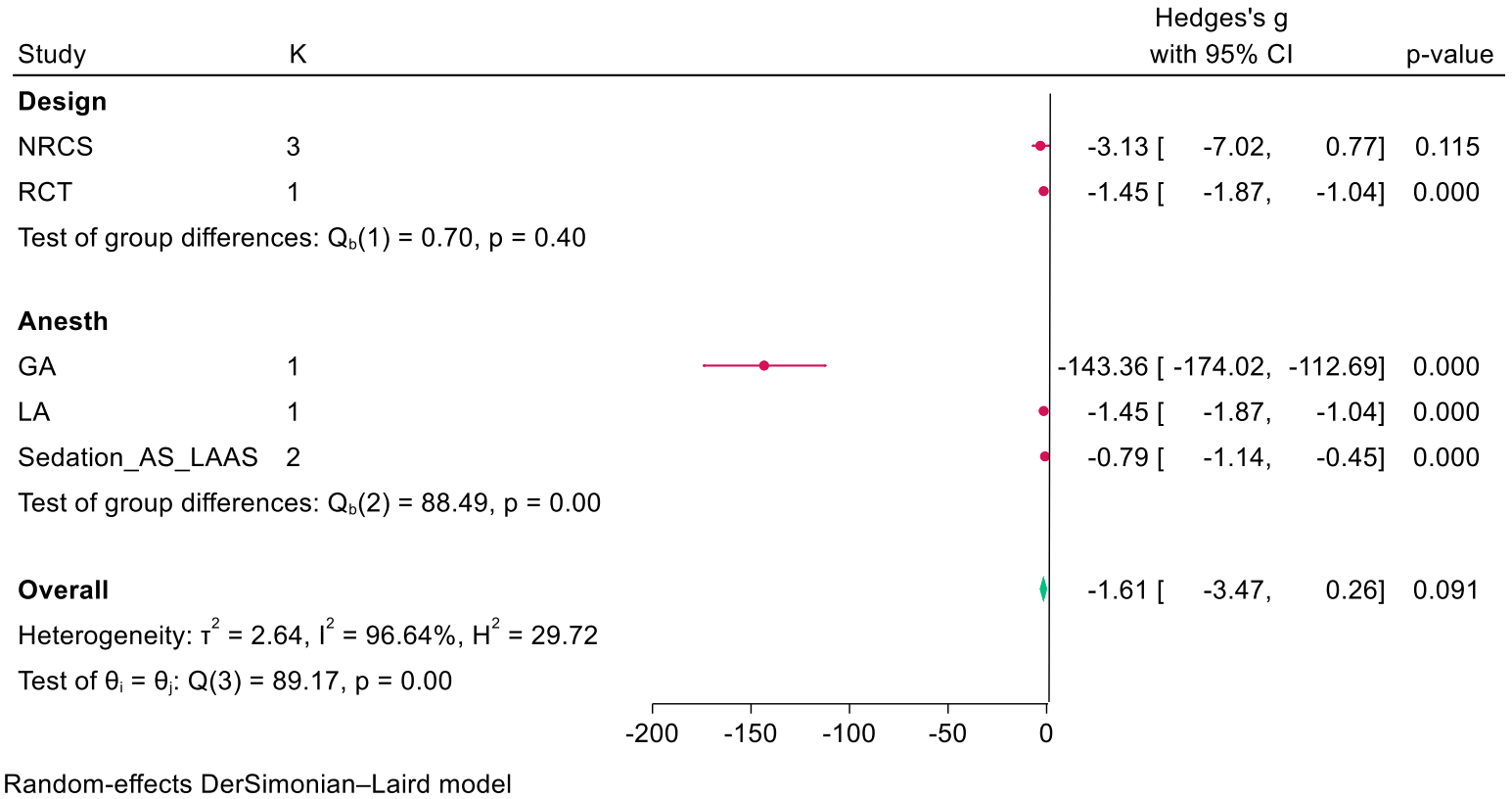
Risk of Bias: High Some concern Low

*excluded due to very high risk of bias.

Per-intervention hypnosis

Any opioid, during the intervention



Random-effects DerSimonian–Laird model

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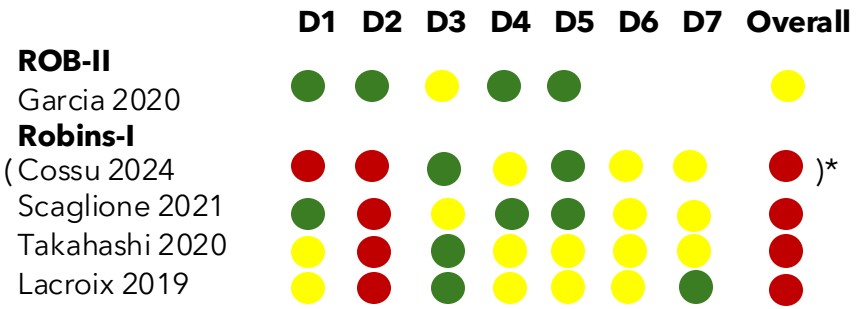
Anesth: type of anaesthesia; GA: General anaesthesia; LA: Local anaesthesia;
AS: Analgosedation; LAAS: Local anaesthesia with analgosedation



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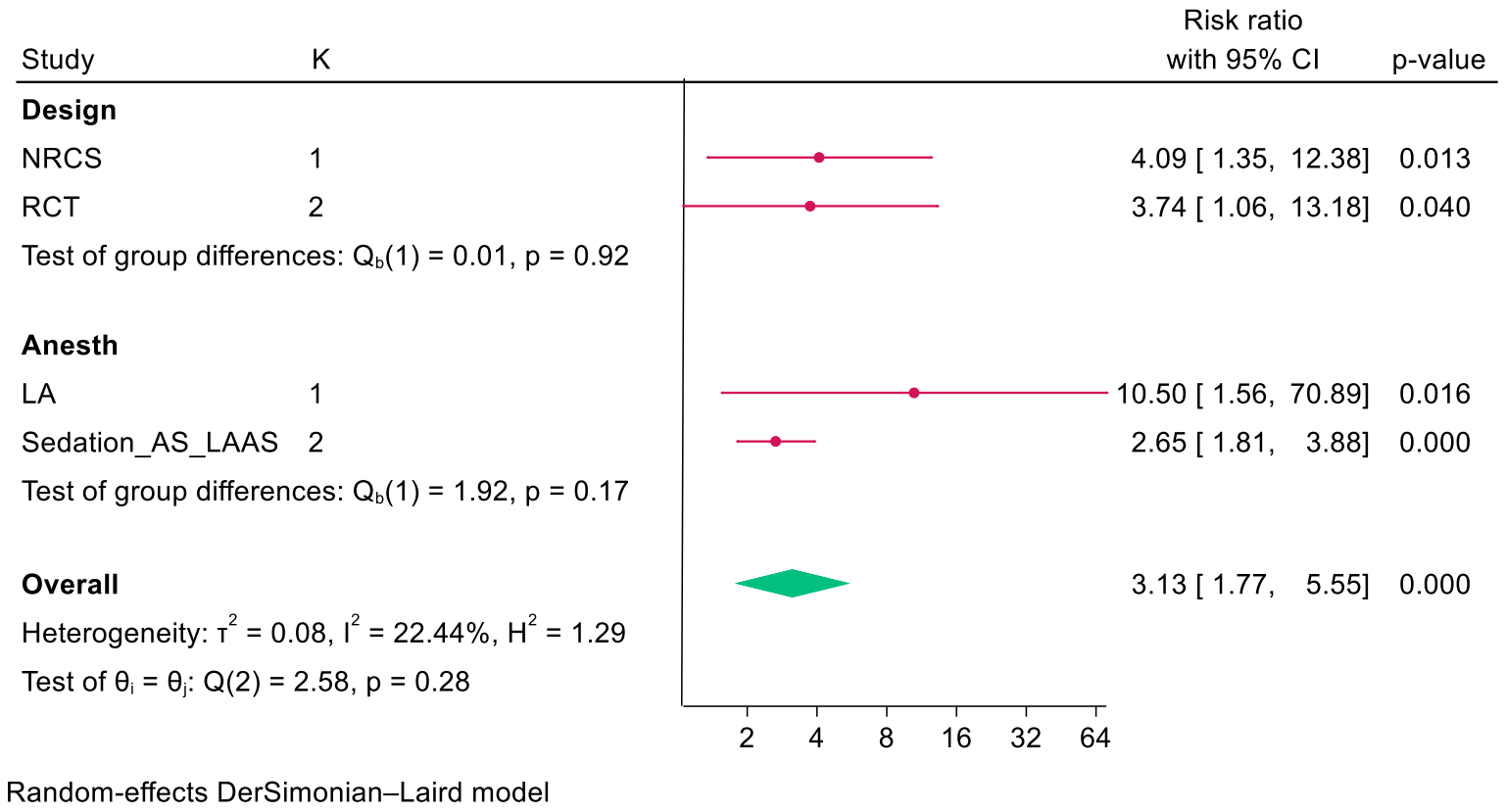
Risk of Bias: High Some concern Low

*excluded due to very high risk of bias.

Per-intervention hypnosis

No need for analgosedation



NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials; Anesth: type of anaesthesia; LA: Local anaesthesia; AS: Analgosedation; LAAS: Local anaesthesia with analgosedation

	D1	D2	D3	D4	D5	D6	D7	Overall
ROB-II								
Marc 2008	🟢	🔴	🟡	🟡	🟡			🔴
Lang 1996	🟡	🟡	🟢	🟡	🟡			🟡
Robins-I								
Elkins 2006	🟢	🔴	🟢	🟢	🟢	🟡	🟡	🔴

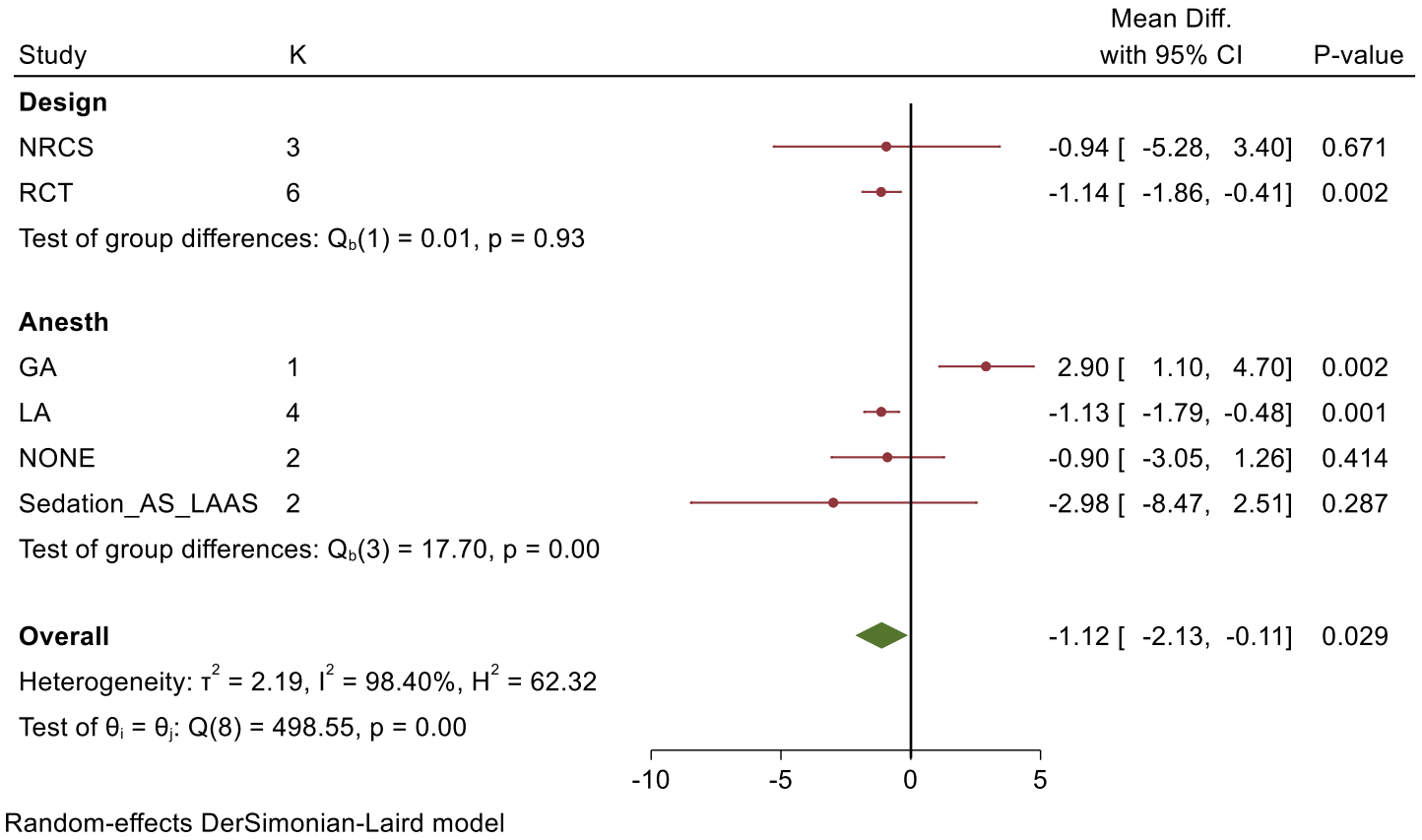
ROB-II : D1-Bias arising from the randomisation process; D2-Bias due to deviations from intended intervention; D3-Bias due to missing outcome data; D4-Bias in Measurement of the outcome; D5- Bias in the selection of the reported results

Robins-I: D1-Bais due to confounding; D2-Bias due to selection of participants; D3-Bias in classification of interventions; D4- Bias due to deviations from intended intervention; D5- Bias due to missing data; D6- Bias due to measurement of outcomes; D7- Bias in the selection of the reported results

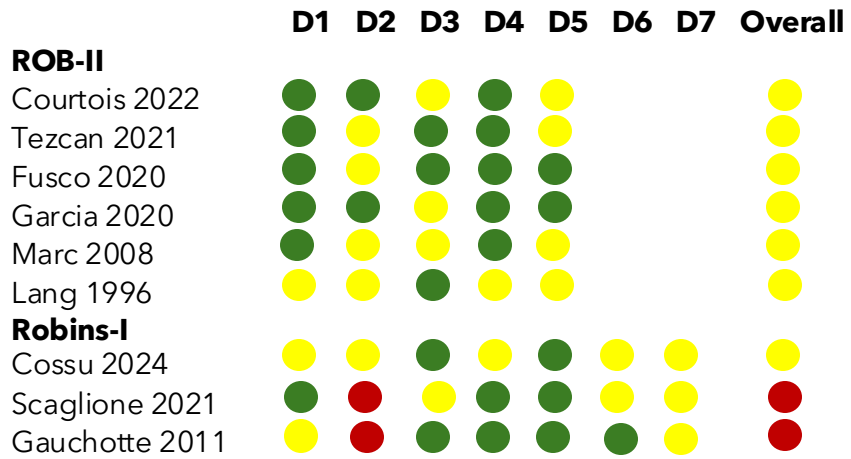
Risk of Bias: High 🔴 Some concern 🟡 Low 🟢

Per-intervention hypnosis

Pain intensity during the intervention (VAS cm)



NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials; Anesth: type of anaesthesia; GA: General anaesthesia; LA: Local anaesthesia; NONE: no anaesthesia



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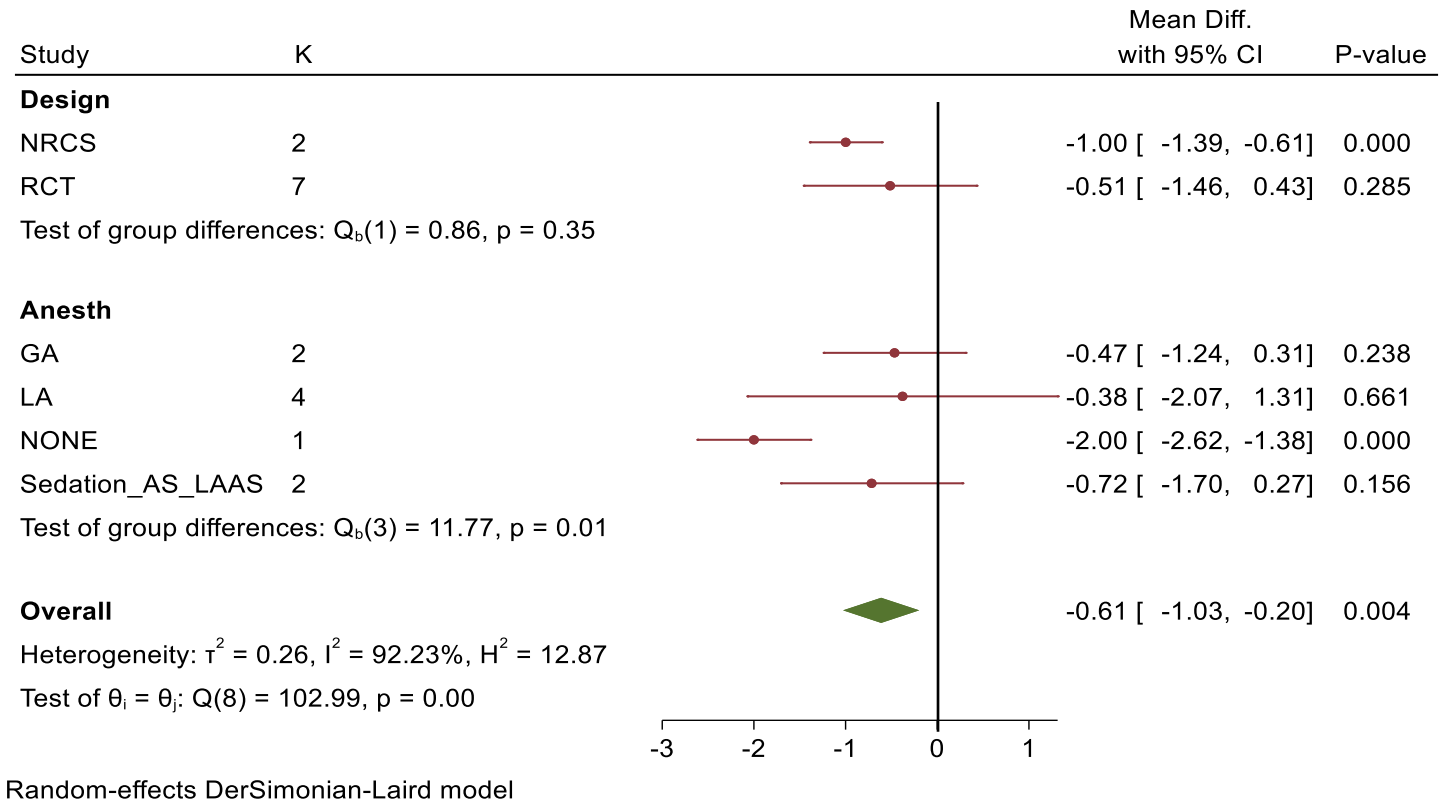
Robins-I: D1-Bais due to confounding; D2-Bias due to selection of participants; D3-Bias in classification of interventions; D4- Bias due to deviations from intended intervention; D5- Bias due to missing data; D6- Bias due to measurement of outcomes; D7- Bias in the selection of the reported results

Risk of Bias: High Some concern Low

Per-intervention hypnosis

Pain intensity after the intervention (VAS cm)



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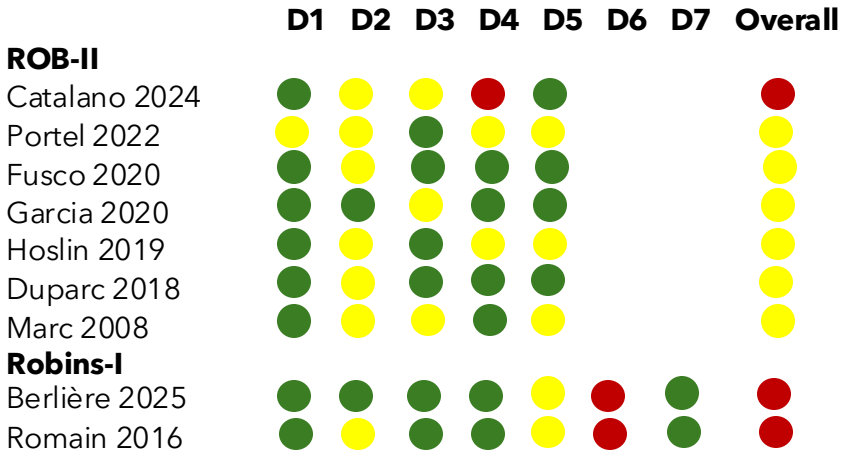

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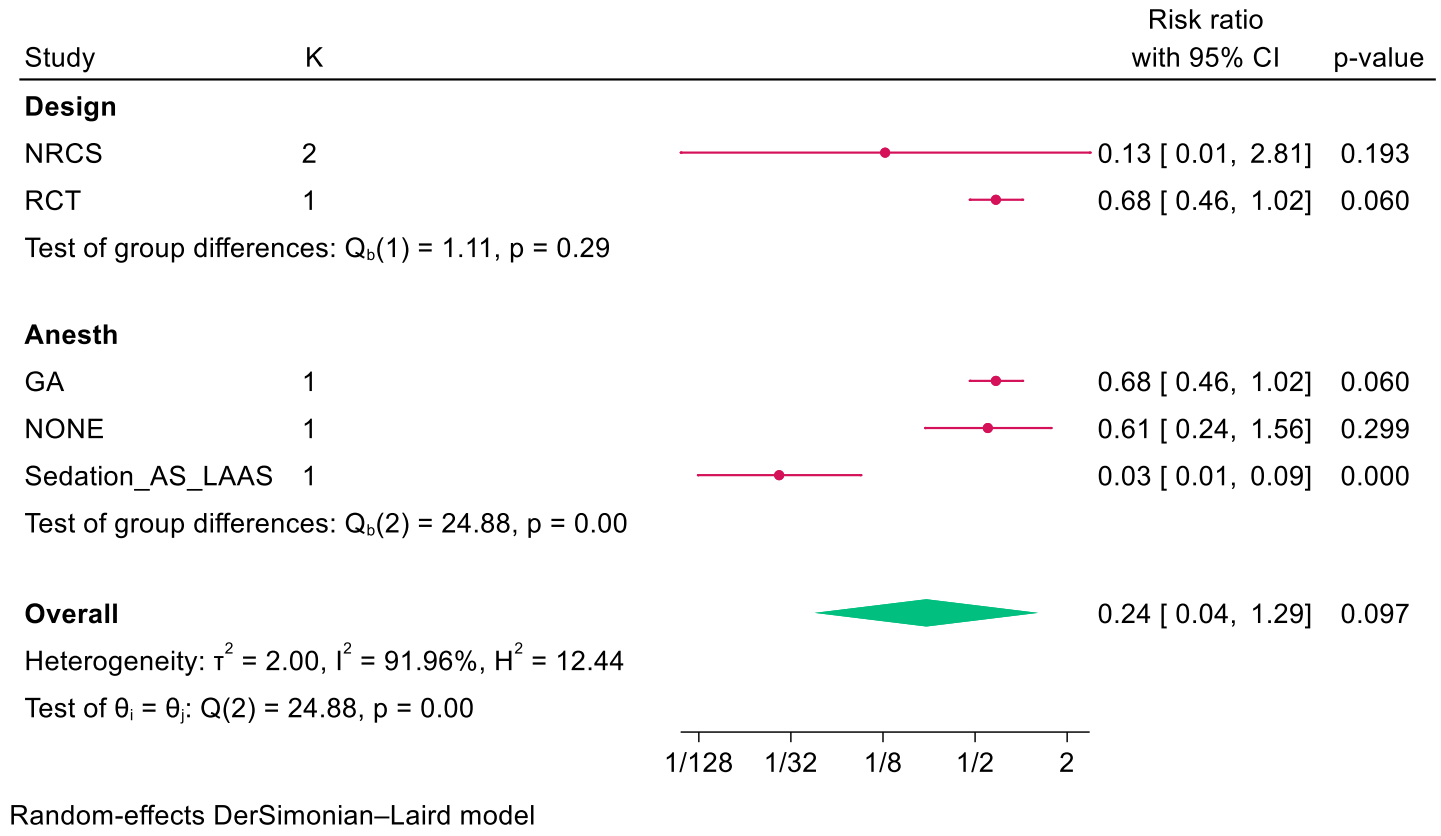
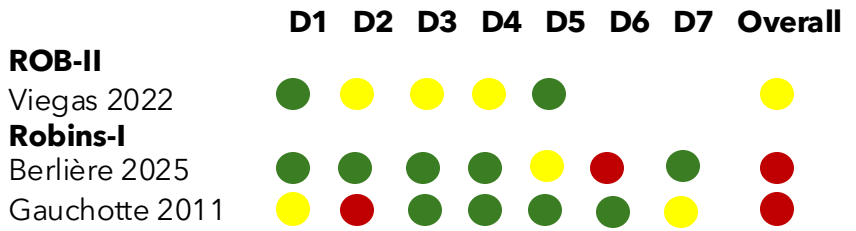
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Need for class I-II analgesic



NRCS: Non-randomized controlled studies; RCT: Randomized controlled trials;
Anesth: type of anaesthesia; GA: General anaesthesia; NONE: no anaesthesia;
AS: Analgosedation; LAAS: Local anaesthesia with analgo sedation



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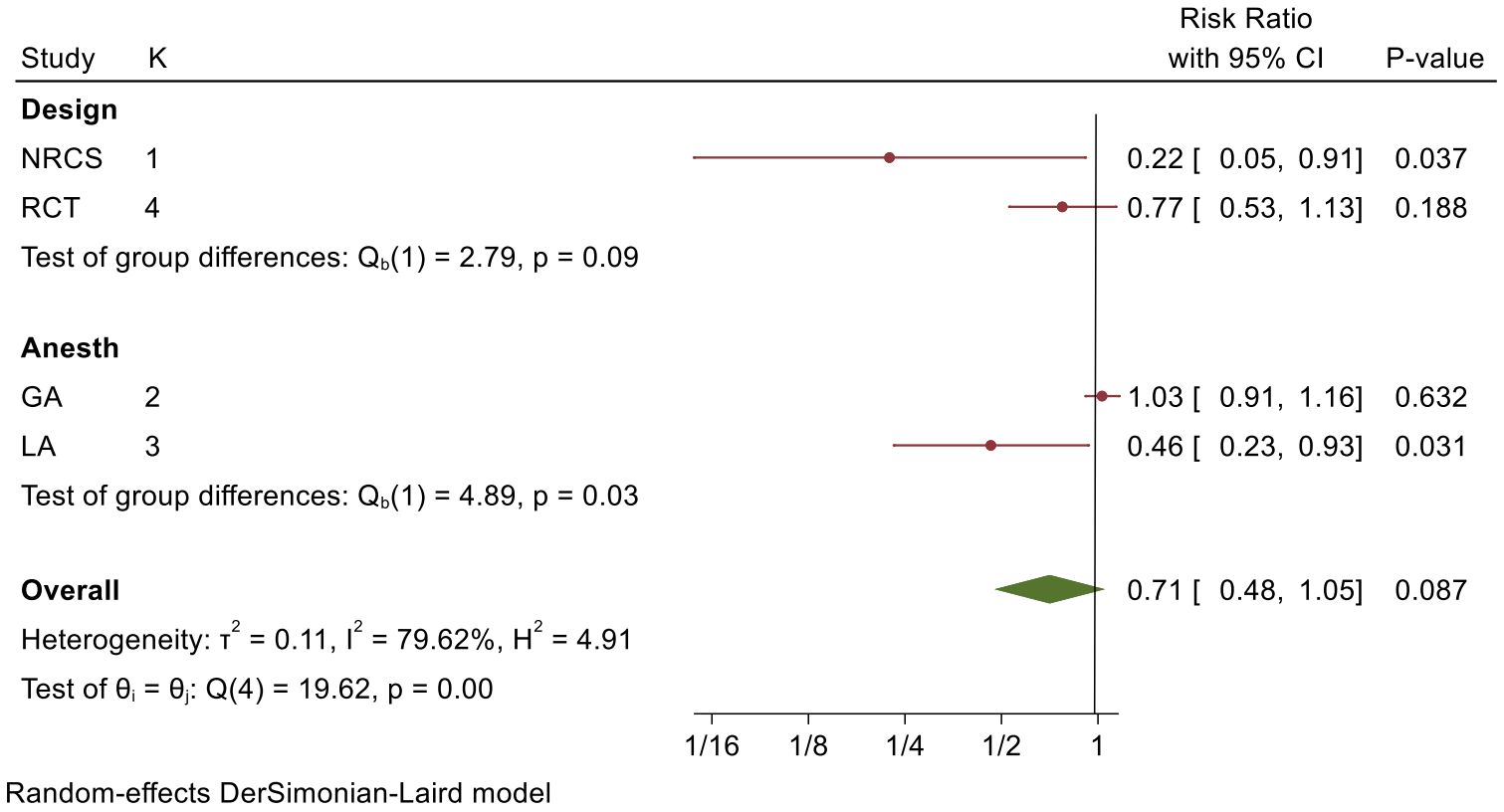
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Need for class III analgesic



Random-effects DerSimonian-Laird model

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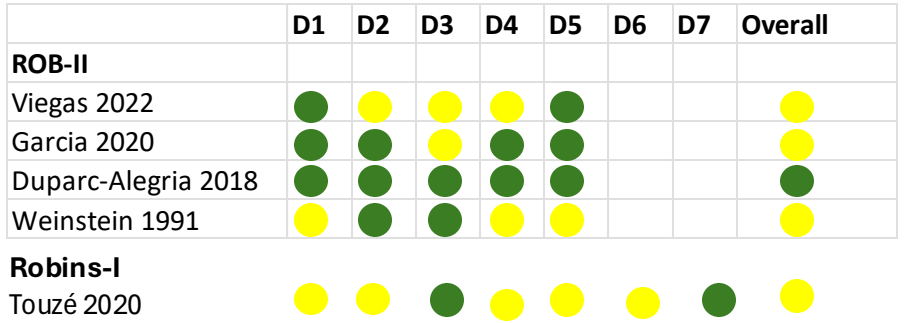

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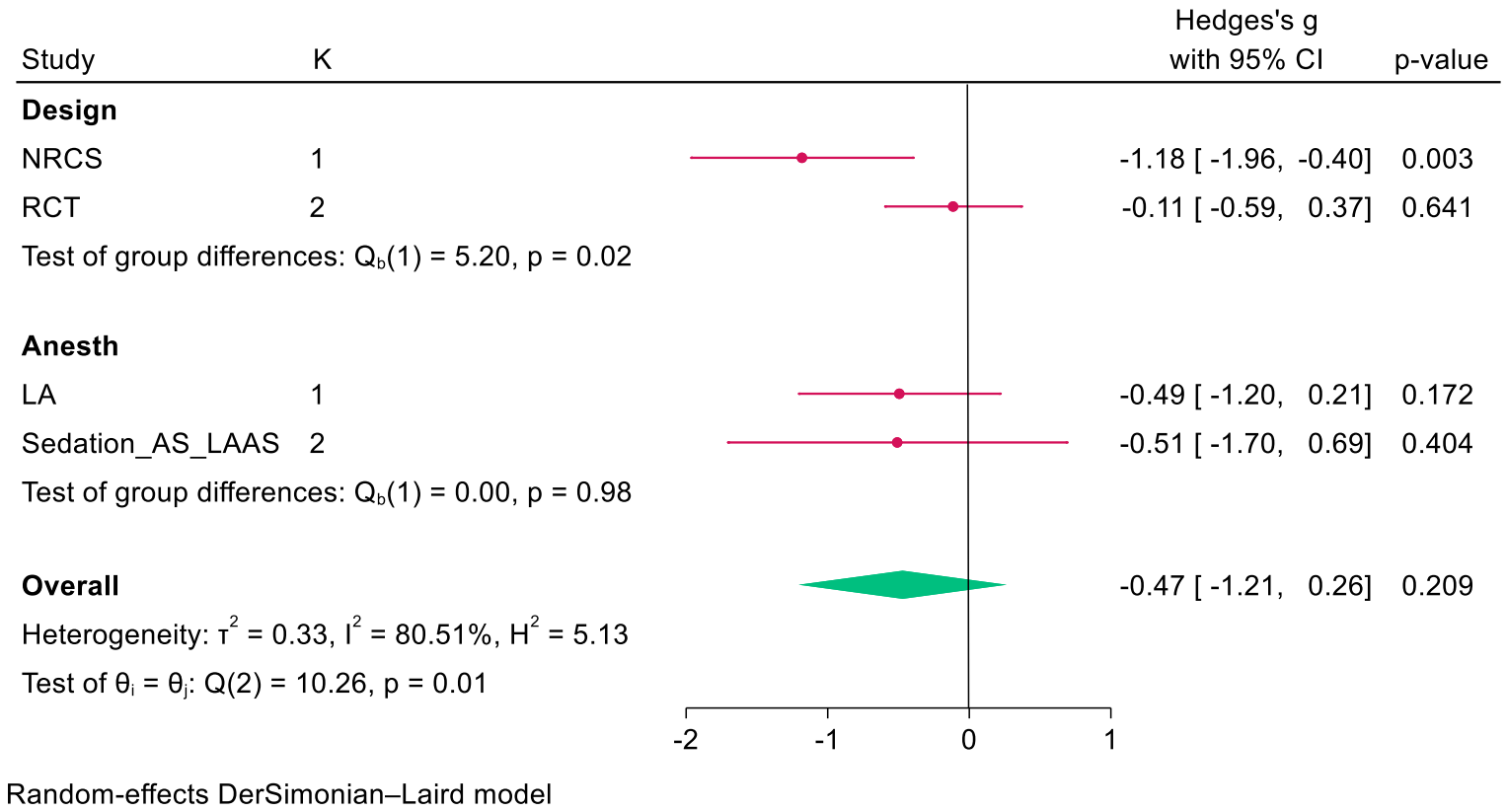
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Anxiety during the intervention (score)



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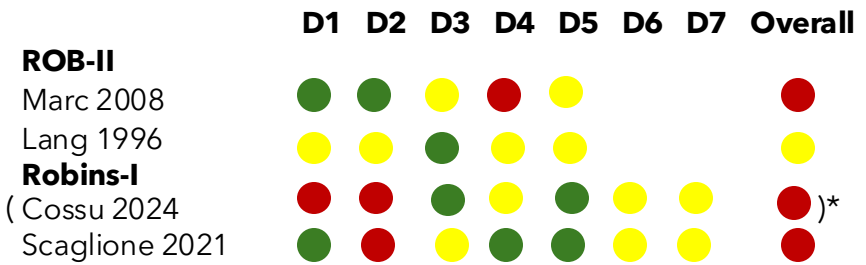

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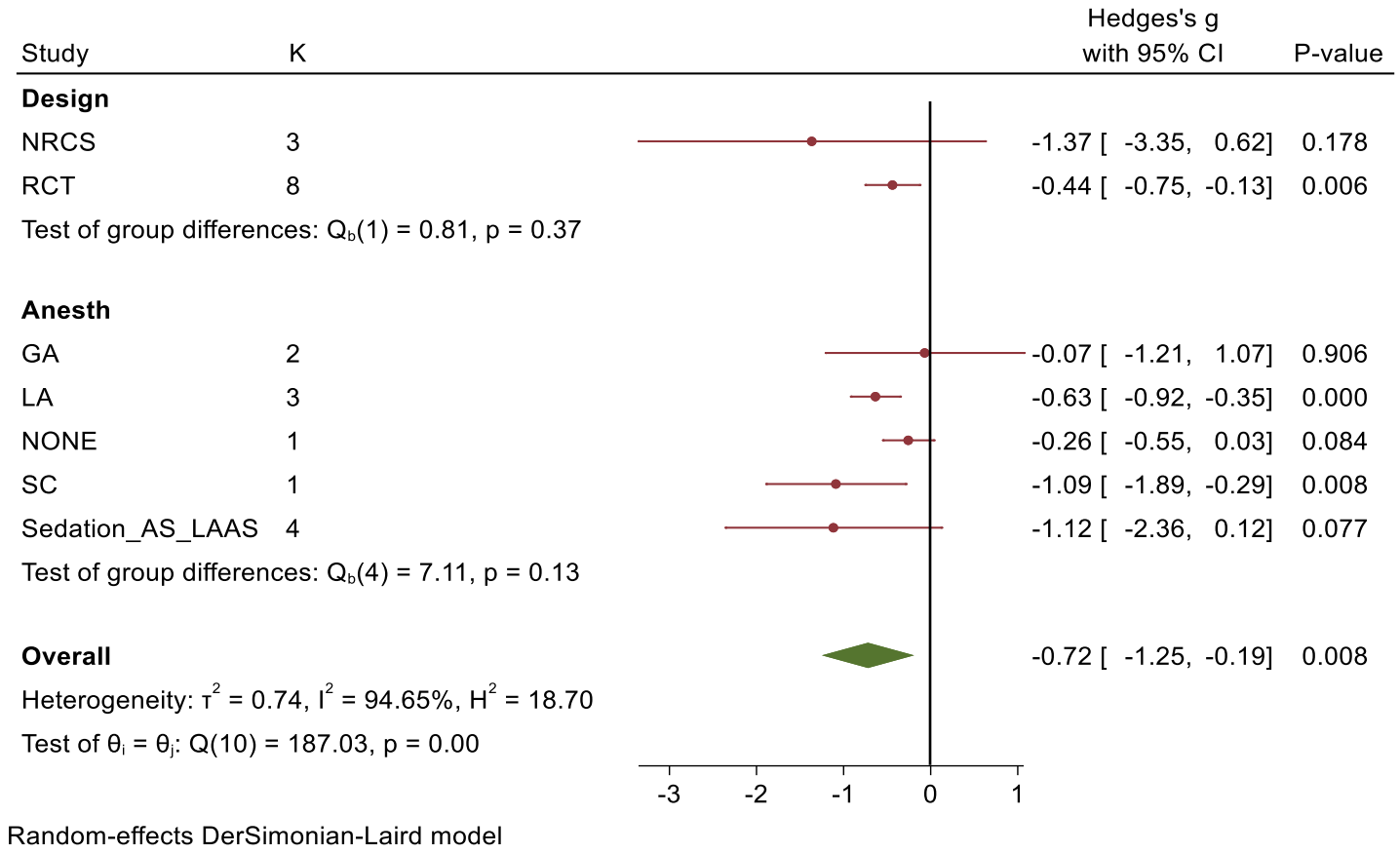
Risk of Bias: High Some concern Low

*excluded due to very high risk of bias.

Per-intervention hypnosis

Anxiety after the intervention (score)



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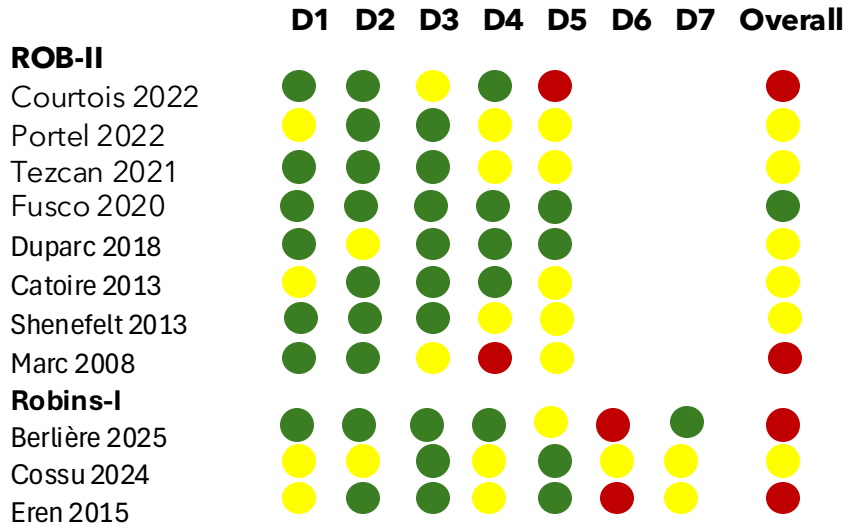

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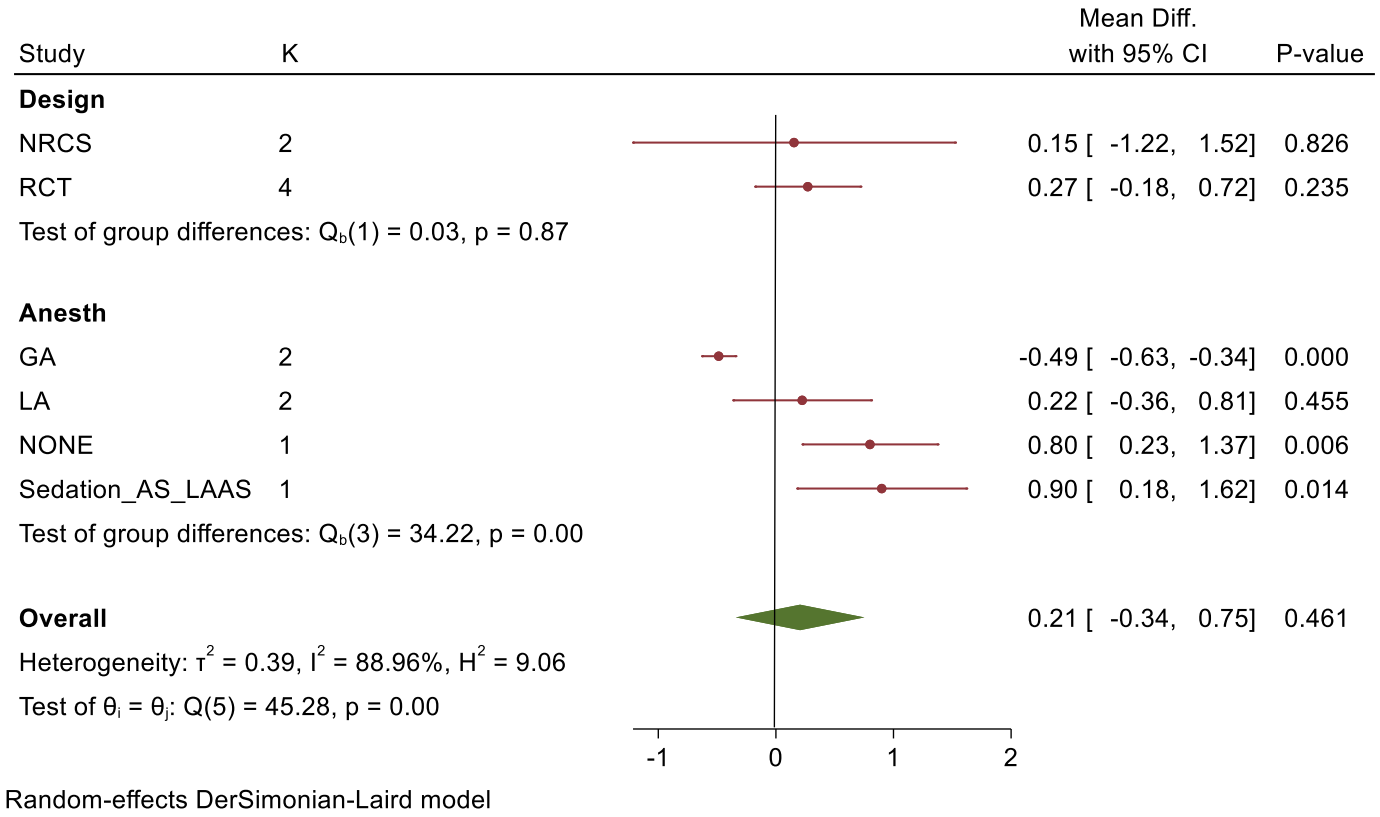
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Patient satisfaction (VAS cm)



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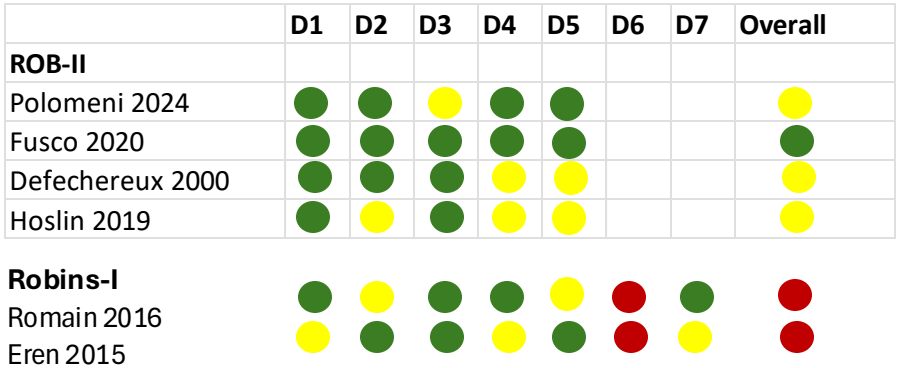

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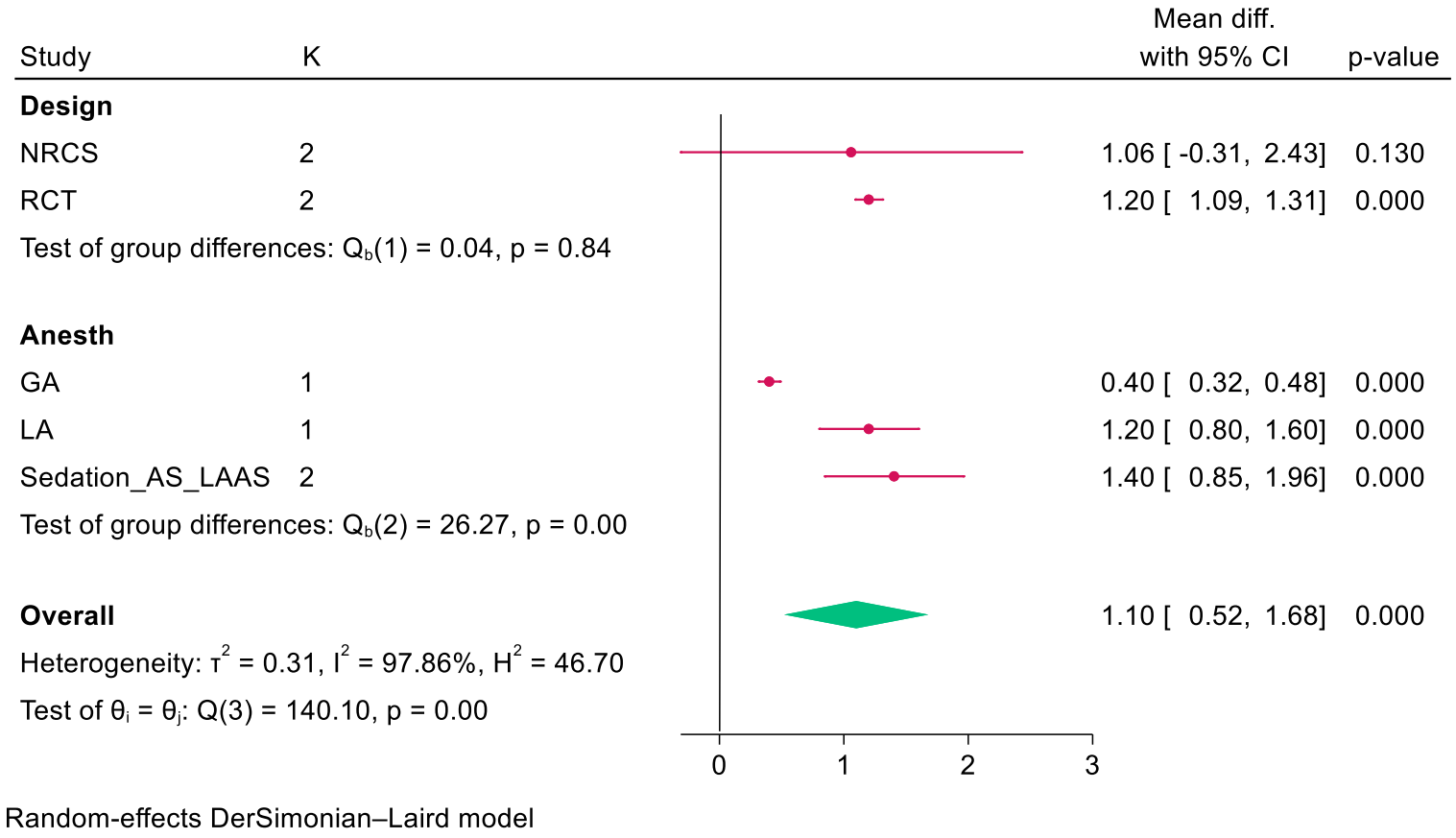
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Medical team satisfaction (VAS cm)



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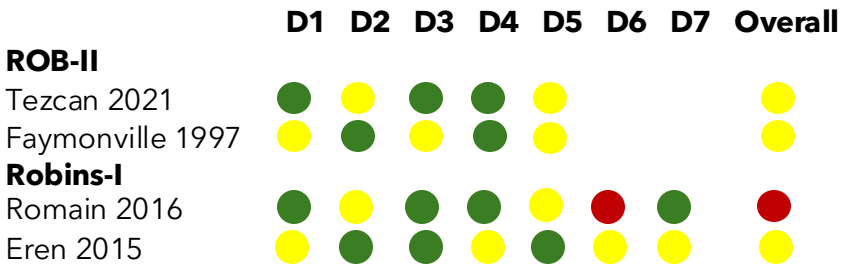

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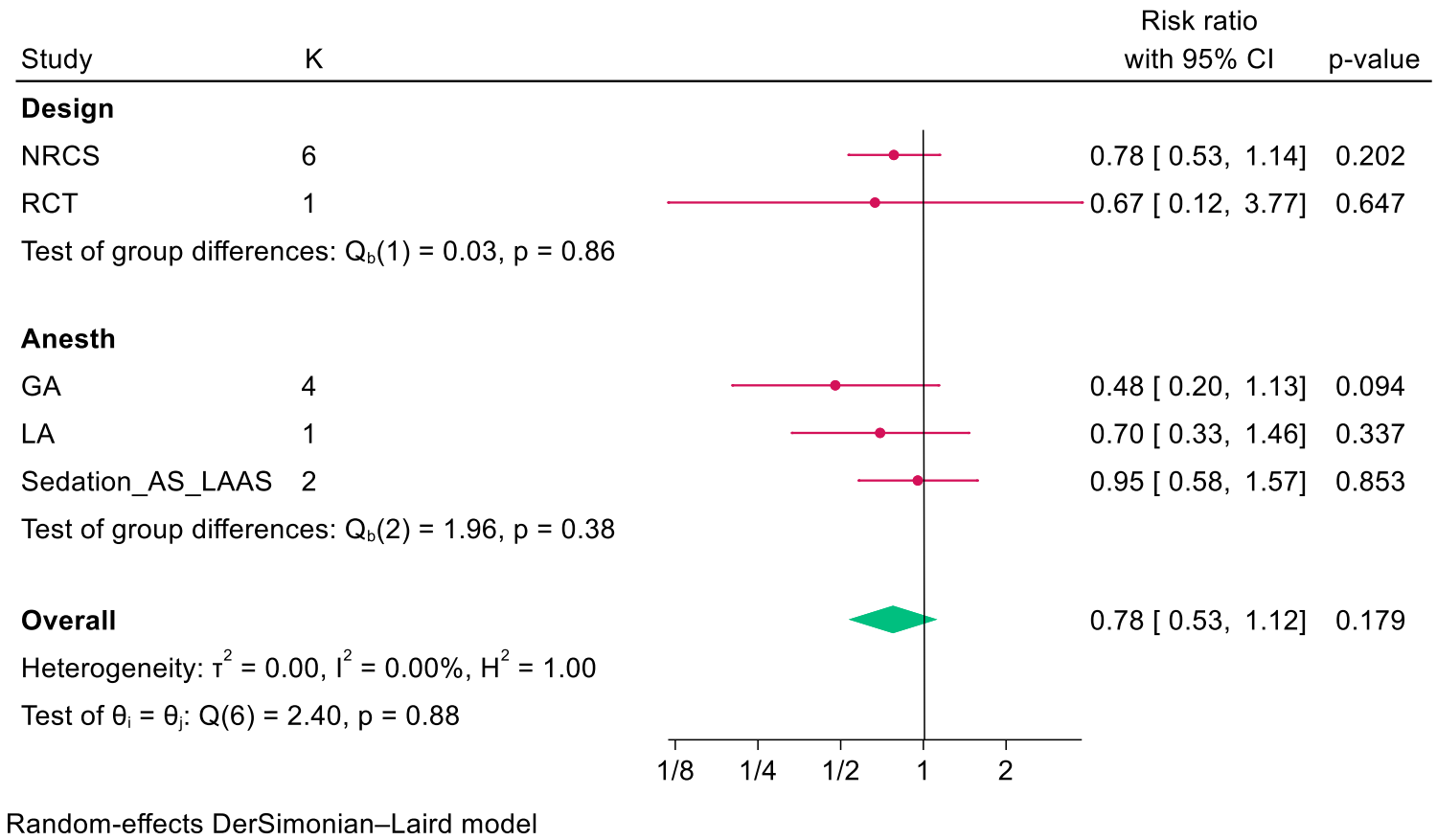
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Complications (yes/no)



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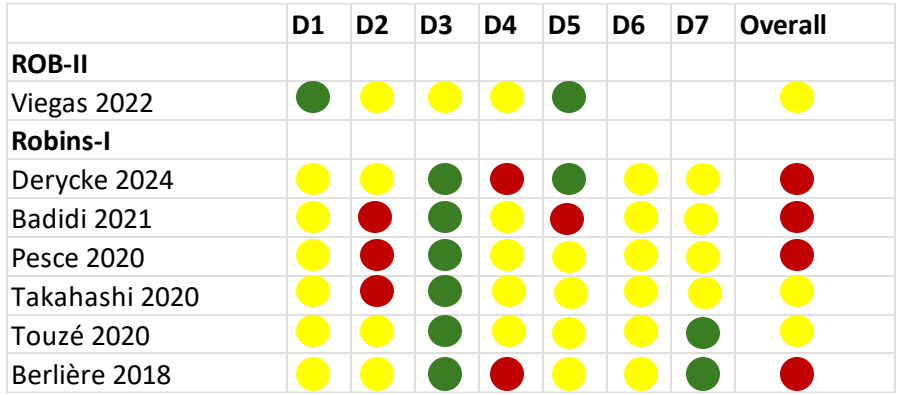

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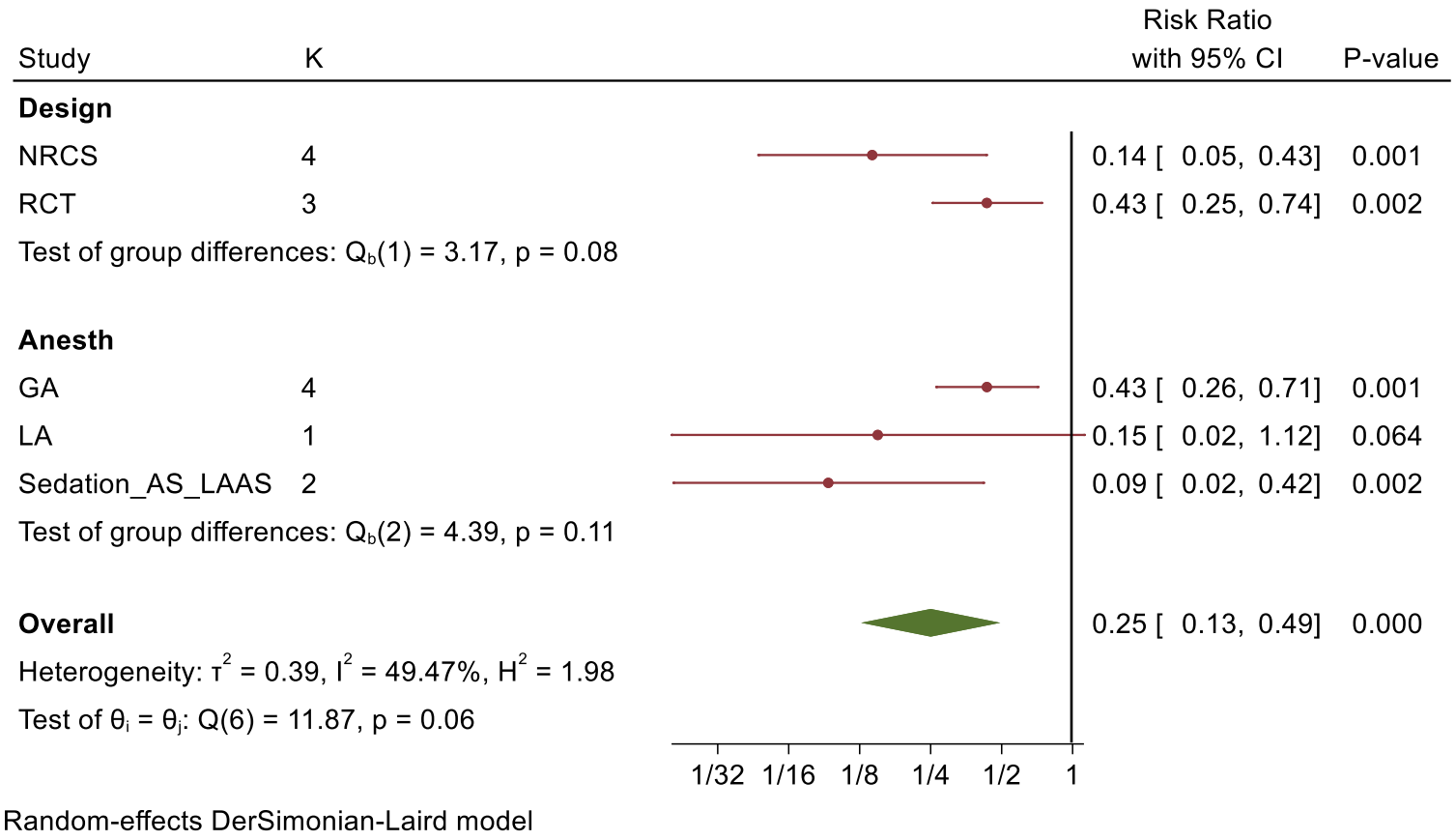
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Postoperative nausea and vomiting



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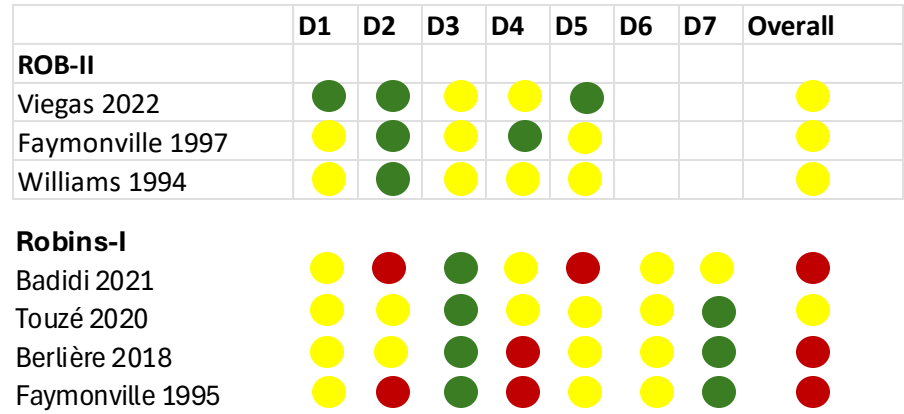

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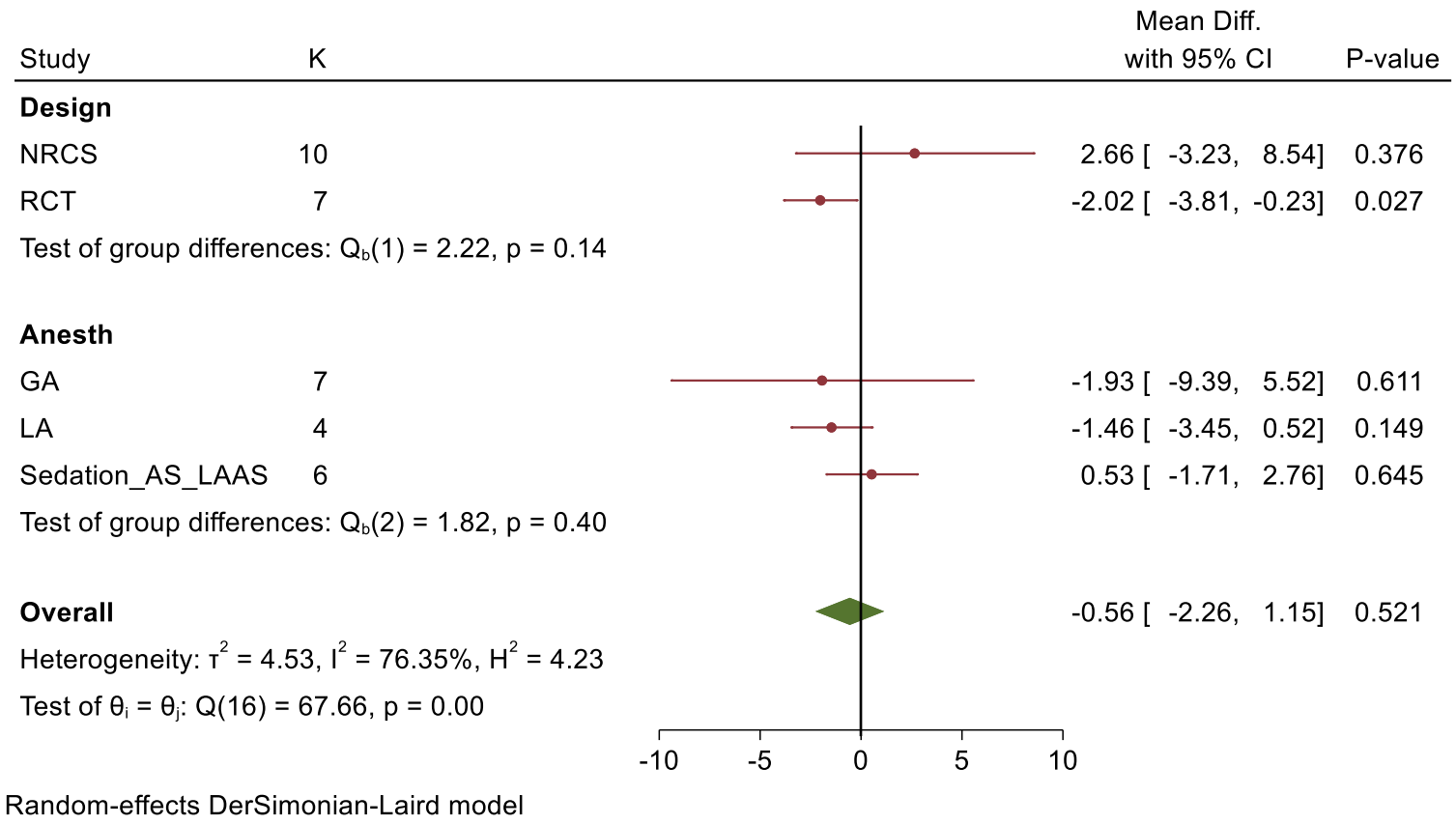
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Procedure duration (min)



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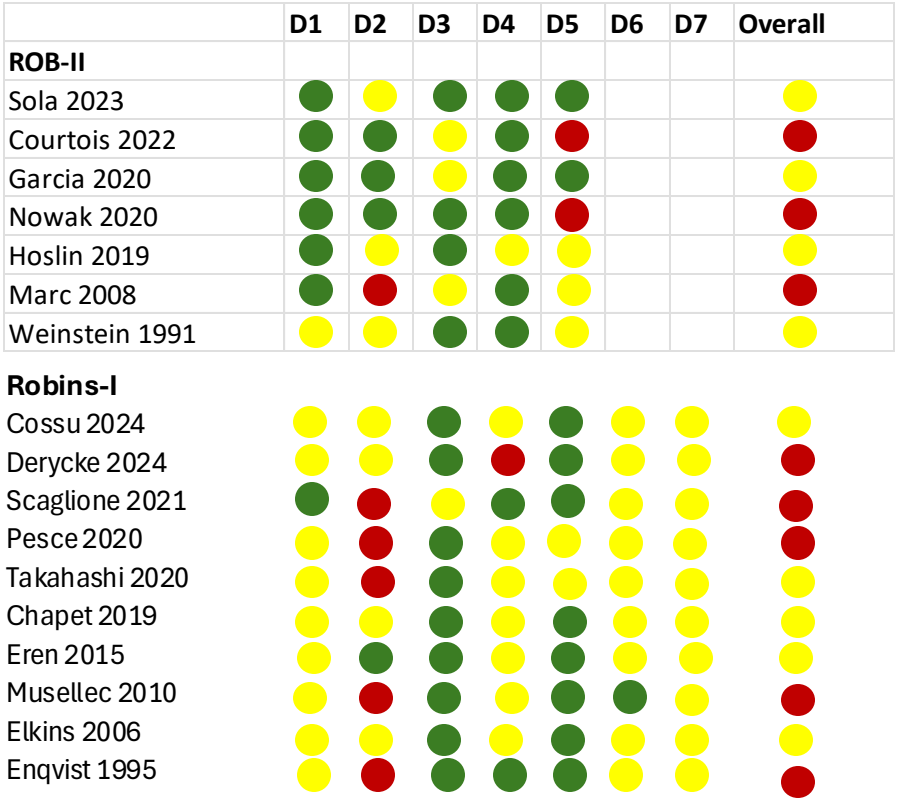

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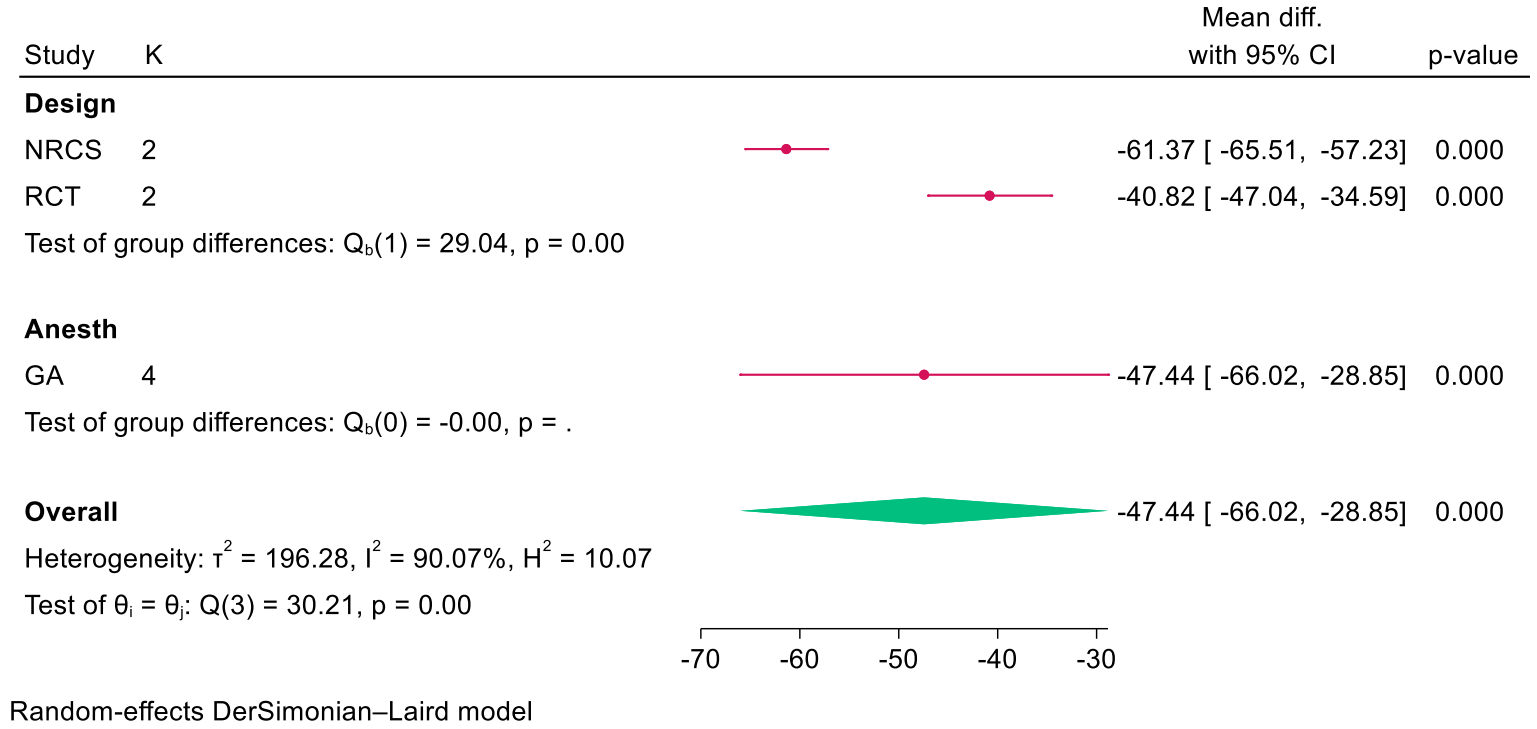
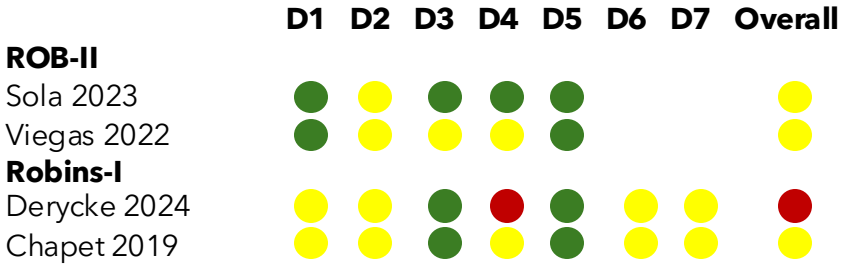
Risk of Bias: High Some concern Low

Per-intervention hypnosis

Time in PACU (min)





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Risk of Bias: High Some concern Low

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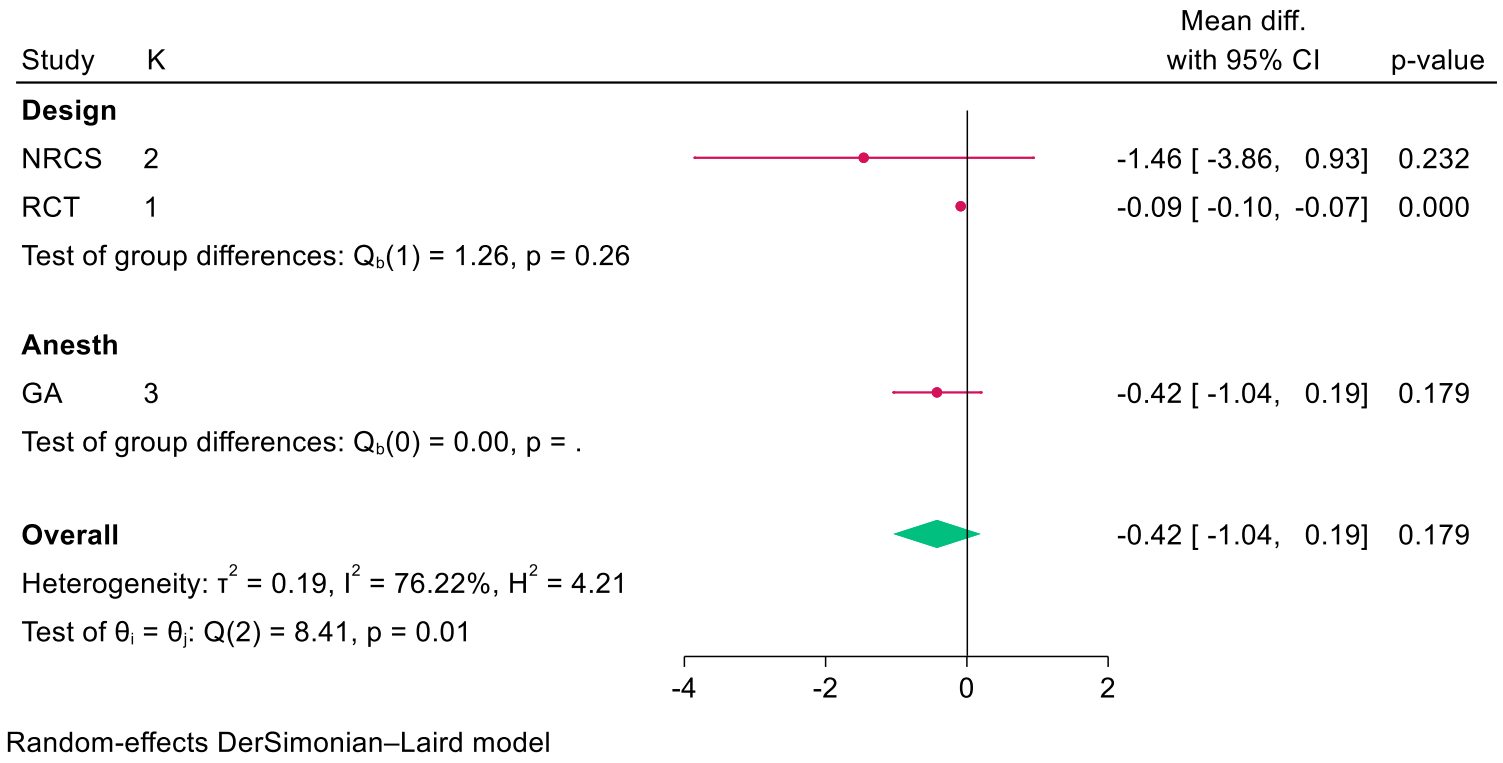
Per-intervention hypnosis

Hospital stay (day)



	D1	D2	D3	D4	D5	D6	D7	Overall
ROB-II								
Sola 2023	🟢	🟡	🟢	🟢	🟢			🟡
Robins-I								
Derycke 2024	🟡	🟡	🟢	🔴	🟢	🟡	🟡	🔴
Enqvist 1995	🟡	🔴	🟢	🟢	🟢	🟡	🟡	🔴

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Risk of Bias: High 🔴 Some concern 🟡 Low 🟢

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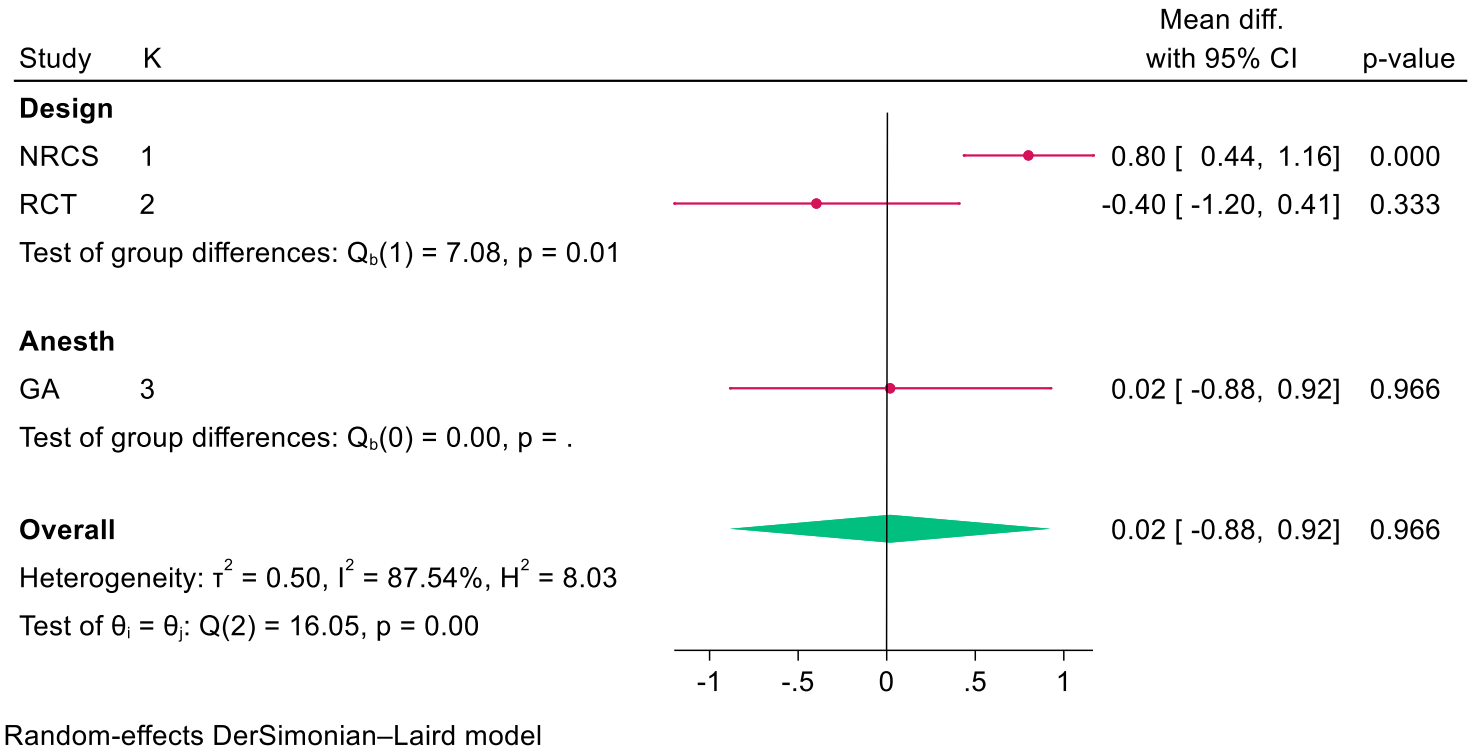
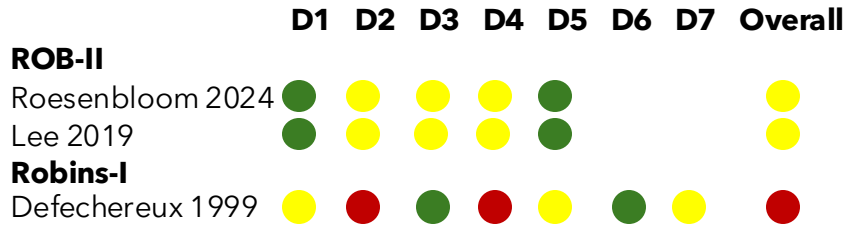
Post-intervention hypnosis

Post-intervention hypnosis

Pain intensity after the intervention (VAS cm)





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