Appendix A: Detailed Electronic Database Search Strategies

PubMed Strategy

Search #	Search String	# Hits
#1	“Capsule Endoscopy”[mh]	1201
#2	(Wireless[tiab] OR radiotelemetr*[tiab]) AND (motility[tiab] OR capsule*[tiab])	661
#3	Smartpill*[tiab]	13
#4	#1 OR #2 OR #3	1658
#5	(animal[mh] NOT human [mh])	3631163
#6	#4 NOT #5	1610

EMBASE Strategy

Search #	Search String	# Hits
#1	(Wireless:ti,ab OR radiotelemetr*:ti,ab) AND (motility:ti,ab OR capsule*:ti,ab)	910
#2	Smartpill:ti,ab	58
#3	#1 OR #2	923
#4	([animals]/lim NOT [humans]/lim)	4411233
#5	#3 NOT #4	862

Appendix B. Forms

Title Review Form

DistillerSR

Reviewer13

Project Wireless Motility Capsule (Switch) User Lilly.Haberl (My Settings)
Messages Nothing new
Live Support User Guide

Review | Datarama | Reports | References | Forms | Manage Levels | Users | Project | Logout

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

1. Is this citation POTENTIALLY relevant to the wireless motility capsule review (i.e., it evaluates the wireless motility capsule (SmartPill), gastric or colonic transit, motility)?

Yes No

Submit Form and go to or Skip to Next

Abstract Review Form

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

BACKGROUND: Skateboarding has been a popular sport among teenagers even with its attendant associated risks. The literature is packed with articles regarding the perils of skateboards. Is the skateboard as dangerous as has been portrayed?

METHODS: This was a retrospective study conducted over a 5 year period. All skateboard related injuries seen in the Orthopaedic unit were identified and data collated on patient demographics, mechanism & location of injury, annual incidence, type of injury, treatment needed including hospitalisation.

RESULTS: We encountered 50 patients with skateboard related injuries. Most patients were males and under the age of 15. The annual incidence has remained low at about 10. The upper limb was predominantly involved with most injuries being fractures. Most injuries occurred during summer. The commonest treatment modality was plaster immobilisation. The distal radius was the commonest bone to be fractured. There were no head & neck injuries, open fractures or injuries requiring surgical intervention.

CONCLUSION: Despite its negative image among the medical fraternity, the skateboard does not appear to be a dangerous sport with a low incidence and injuries encountered being not severe. Skateboarding should be restricted to supervised skateboard parks and skateboarders should wear protective gear. These measures would reduce the number of skateboarders injured in motor vehicle collisions, reduce the personal injuries among skateboarders, and reduce the number of pedestrians injured in collisions with skateboarders.

Submit Form and go to or Skip to Next

Wireless Motility Capsule vs. Other Diagnostic Technologies for Evaluating Gastroparesis and Slow-Transit Constipation: A Comparative Effectiveness Review
Abstract Review Form

1. Exclude article if: **(Check the first response that applies)**

- ☐ No original data (e.g., review article, commentary, editorial)
- ☐ No subjects with suspected gastroparesis or slow-transit constipation
- ☐ Does not evaluate the wireless motility capsule or a capsule that measures pH, pressure, motility, or transit time
- ☐ No human subjects
- ☐ Does not include an **adult population**
- ☐ Other reason for exclusion (specify:)

2. Unclear

- ☐ Unclear - pull article for review

3. Include

- ☐ Include article for review
- ☐ Mark if case report

4. Handsearch

- ☐ Exclude article from review, but pull for handsearching (i.e., systematic review published since 2005)

Tests for the evaluation of gastroparesis	Tests for the evaluation of slow-transit constipation
• Gastric scintigraphy • Antroduodenal manometry • Endoscopy	• Radiopaque markers • Scintigraphy

5. Comments **(Please limit to 250 characters)**

Submit Form and go to or Skip to Next

Article Review Form

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

Wireless Motility Capsule vs. Other Diagnostic Technologies for Evaluating Gastroparesis and Slow-Transit Constipation: A Comparative Effectiveness Review
Article Review

1. Exclude article if: (Check the first response that applies)

- ☐ No original data (e.g. review article, commentary, editorial)
- ☐ No subjects with suspected gastroparesis or slow-transit constipation unless evaluates the wireless motility capsule
- ☐ Does not evaluate the wireless motility capsule (exclude Given, Bravo, Heidelberg capsule, video capsule endoscopy, OMOM, M2A, and patency capsules)
- ☐ Does not have an appropriate comparison group (see below) AND does not report on harms of the wireless motility capsule
- ☐ Does not report on an outcome of interest
- ☐ No human subjects
- ☐ Does not include an adult population
- ☐ Does not apply to key question
- ☐ Other reason for exclusion (specify):

2. Include

- ☐ Include article for gastroparesis
- ☐ Include article for slow-transit constipation
- ☐ Include article for harms

3. Handsearch

- ☐ Exclude article from review, but pull for handsearching (i.e., systematic review published since 2005)

Tests for the evaluation of gastroparesis	Tests for the evaluation of slow-transit constipation
• Gastric scintigraphy • Antroduodenal manometry • Endoscopy	• Radiopaque markers • Scintigraphy

4. Comments (limit 250 characters):

Data Abstraction Forms

Table 1. Study Design data abstraction form

Refid	Author, year	Study design	Other study design	Country - Select if US	Country - Specify other	Location of recruitment	Other location of recruit ment	Start year of recruitment	Multi vs. Single center
		• RCT • Retrospective cohort • Prospective cohort • Prospective cohort with historical comparison • Other study design		• US • Multi including US • Multi not including US • Other • Not reported		• General public • Tertiary center • Other • Not reported			• Multi-center • Single center • Not reported

Length of followup reported as	Length of followup	Unit for length of followup	Length of time between tests reported as	Enter the length of time in between tests	Unit for length of time in between tests	Type of patients included - gastroparesis	Type of patients included - constipation	Were normal people included	Inclusion criteria
• Mean • Median • Range		• None • Days • Weeks • Months • Years • Not reported	• Mean • Median • Range		• None • Days • Weeks • Months • Years • Not reported	• Known • Suspected • Not applicable	• Known • Suspected • Not applicable	• Yes • No	

Table 2. Population characteristics data abstraction form

Refid	Author, year	Sample size at baseline	Population	Age-Select measure	Age	Gender not reported	Gender, N male	Gender, % male	Race not reported	Race, N White	Race, % White
				• Mean • Median • Range • Not reported					• Not reported		

Race, N African American	Race, % African American	Race, N Asian	Race, % Asian	Race, N Hispanic	Race, % Hispanic	Race, specify other race	Race, N other	Race, % other	Weight-Select measure	Weight (kg)	Prior testing, specify prior test
									• Mean • Median • Range • Not reported		

Prior testing, N	Prior testing, %	Blood sugar-Select measure	Blood sugar	Smoking status, define smoker	Smoker, n	Smoker, %	Specify type of diabetes	Diabetes, N	Diabetes, %	Defecatory dysfunction, N	Defecatory dysfunction, %
		• Mean • Median • Range • Not reported					• Type 1 • Type 2 • Both • Not specified • Not reported				

Prior use of prokinetics, N	Prior use of prokinetics, %	Prior use of narcotics, N	Prior use of narcotics, %	Prior use of antidepressants, N	Prior use of antidepressants, %	Prior use of PPIs, N	Prior use of PPIs, %	Prior use of laxatives, N	Prior use of laxatives, %

Use of prokinetics at time of test, N	Use of prokinetics at time of test, %	Use of narcotics at time of test, N	Use of narcotics at time of test, %	Use of antidepressants at time of test, N	Use of antidepressants at time of test, %	Use of PPIs at time of test, N	Use of PPIs at time of test, %	Use of laxatives at time of test, N	Use of laxatives at time of test, %

Table 3. Diagnostic test data abstraction form

Refid	Author, year	Diagnostic test	Criteria used for diagnosis of gastroparesis	Criteria used for diagnosis of slow-transit constipation	Were patients off tobacco at time of test?	Were patients off prokinetics at time of test?	Were patients off of narcotics at time of test?
		• Wireless motility capsule • Gastric scintigraphy • Antroduodenal manometry • Endoscopy • Colonic scintigraphy • Radiopaque			• Yes • No • Not reported	• Yes • No • Not reported	• Yes • No • Not reported

Were patients off antidepressants at time of test?	Were patients off of PPIs at time of test?	Were patients off laxatives at time of test?	If wireless motility capsule, was the pill swallowed or placed?	If wireless motility capsule, was a standardized meal used?	If wireless motility capsule, enter standardized meal
• Yes • No • Not reported	• Yes • No • Not reported	• Yes • No • Not reported	• Swallowed • Placed	• Yes • No • Not reported	

If wireless motility capsule, were patients given Ensure?	Record number of hours after test Ensure was given	If gastric scintigraphy, what was the duration of testing?	If gastric scintigraphy, were liquid or solid components used?	If manometry, which catheter was used?	If manometry, how was the catheter placed?
• Yes • No • Not reported		• 1.5-hour • 2-hour • 3-hour • 4-hour/Tougas • Other • Not reported	• Liquid • Solid • Both • Not reported		• Endoscopy • Fluoroscopy • Blind passage • Other • Not reported

If endoscopy, enter the number of hours without food (NPO)	If endoscopy, indicate the method of sedation	If colonic scintigraphy, enter the protocol used	If colonic scintigraphy, enter the duration of testing	If ROM, enter the type of markers used	If ROM, enter the timing of markers
• 6 hours • Other • Not reported	• Conscious sedation • General • Other • Not reported	• Temple • Mayo • Other • Not reported		• Circles • Other • Not reported	

Table 4. Outcomes data abstraction form

Refid	Author, year	What outcome of interest did you find?	Other outcome (please describe):	If diagnostic accuracy, what are the comparisons?	1st reviewer: where is the outcome found in paper:	2nd reviewer: abstracted or not?	2nd reviewer: if not abstracted, please document why
		• Diagnostic accuracy- gastroparesis • Diagnostic accuracy- constipation Transit time • Pressure patterns • Change in medications • Change in nutrition • Surgery • Need for referral • Symptom improvement • Quality of life • Patient satisfaction • Test failure (unable to read test results) • Need for additional tests because of continued uncertainty about diagnosis • Utilization of other health care services • Capsule retention • Radiation exposure • Mortality • Other				• Outcome abstracted • Outcome not abstracted	

Table 5. Study quality data abstraction form

Refid	Author, year	Were "healthy" and "normal" patients excluded from the diagnostic accuracy comparison?	Were severely affected patients excluded?	Was a random sample of patients enrolled (as opposed to consecutive)?	Did all patients receive the same reference standard?	Were all patients included in the analysis?
		• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear

Did the study specifically state that the results (reference standard and SmartPill) were interpreted without knowledge of the results of the other tests?	Is the time period between reference standard and SmartPill test short enough to be reasonably sure that the target condition did not change between the two tests (within 3 months)?	Were cut-off values of tests positivity for the reference standard and SmartPill established before the study was started (in the methods section)?	Was a stated aim of the study to compare the diagnostic accuracy of SmartPill compared to scintigraphy, manometry, radiopaque markers, or endoscopy among patients with symptoms of or with gastroparesis or constipation?	Did the study report on conflicts of interest ("none declared" and "no conflicts reported" counts as a yes)?	If conflicts of interest reported, was the study itself funded by a commercial source related to motility testing?	If yes (funded by commercial source related to motility testing), were any of the authors employed by a commercial source or receive funding or fees from a commercial source related to motility testing?
• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear	• Yes • No • Unclear

Appendix C: Exclusion Report

Adler, D. G., Chand, B., Conway, J. D., Diehl, D. L., Kantsevoy, S. V., Kwon, R. S., Mamula, P., Rodriguez, S. A., Shah, R. J., Song, L. M., and Tierney, W. M. Capsule endoscopy of the colon. Gastrointest Endosc. 2008; 68 (4): 621-3. **No original data**

Ahmad, N. A., Iqbal, N., and Joyce, A. Clinical impact of capsule endoscopy on management of gastrointestinal disorders. Clin Gastroenterol Hepatol. 2008; 6 (4): 433-7. **Not wireless motility capsule**; **does not apply to key question**

Amano, Y., Yuki, T., Kusunoki, R., and Kinoshita, Y. Gastric screening examination using PillCam ESO 2: a pilot study. Dig Liver Dis. 2011; 43 (7): 580-1. **Not wireless motility capsule**

Aparicio, J. R., Martinez, J., and Casellas, J. A. Right lateral position does not affect gastric transit times of video capsule endoscopy: a prospective study. Gastrointest Endosc. 2009; 69 (1): 34-7. **No subjects with gastroparesis or constipation**

Apostolopoulos, P., Kalantzis, C., Gralnek, I. M., Liatsos, C., Tsironis, C., and Kalantzis, N. Clinical trial: effectiveness of chewing-gum in accelerating capsule endoscopy transit time--a prospective randomized, controlled pilot study. Aliment Pharmacol Ther. 2008; 28 (4): 405-11. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Atia, A., Rammohan, M., Ahn, C., Hebuterne, X., Girard-Pipau, F., and Buchman, A. L. Pectin supplementation increases colonic short chain fatty acid production(SCFA) in patients with short bowel syndrome(SBS). Gastroenterology. 2009; 136 (5): A140. **No subjects with gastroparesis or constipation; no appropriate comparison**

Attaluri, A., Valestin, J., and Rao, S. S. C. Is small bowel and colonic motility altered in constipated patients with methanogenic flora?. Neurogastroenterol. Motil.. 2010; 22 79. **No appropriate comparison**

Bai, Y., Gao, J., Song, B., Zhou, Y. Q., Zou, D. W., and Li, Z. S. Surgical intervention for capsule endoscope retained at ileal stricture. Endoscopy. 2007; 39 Suppl 1 E268-9. **Not wireless motility capsule**

Baichi, M. M., Arifuddin, R. M., and Mantry, P. S. What we have learned from 5 cases of permanent capsule retention. Gastrointest Endosc. 2006; 64 (2): 283-7. **Not wireless motility capsule**

Baker, J., Hasler, W. L., Camilleri, M., Rao, S., Thorne, N. K., Ringel, Y., Kuo, B., Esfandyari, T., Gupta, A. D., Scott, S. M., McCallum, R., Parkman, H. P., Soffer, E. E., and Di Baise, J. K. Impairment of overall and regional high amplitude colon contractions in severe slow transit constipation measured by wireless motility capsules. Gastroenterology. 2011; 140 (5): S531. **No appropriate comparison**

Banerjee, R. and Reddy, D. N. Endoscopy-assisted wireless intragastric pH monitoring. Gastrointest Endosc. 2007; 65 (1): 182. **No original data**; **not wireless motility capsule**

Berry, P. A., Srirajaskanthan, R., and Anderson, S. H. An urgent call to the magnetic resonance scanner: potential dangers of capsule endoscopy. Clin Gastroenterol Hepatol. 2010; 8 (5): A26. **No original data**; **not wireless motility capsule**

Biao, H., Guozheng, Y., and Peng, Z. Multi-sensor radiotelemetry system for intestinal motility measurement. J Med Eng Technol. 2009; 33 (1): 66-71. **No subjects with gastroparesis or constipation**

Bosworth, B. P., Cohen, M., Weine, D. M., and Scherl, E. J. Colonic pH is lower in patients with mild ulcerative colitis compared to normal controls. Gastroenterology. 2009; 136 (5): A682-A683. **Other exclusion**

Bredenoord, A. J., Stolk, M. F., and Al-toma, A. Unintentional video capsule bronchoscopy. Eur J Gastroenterol Hepatol. 2009; 21 (5): 593. **Not wireless motility capsule**

Brun, W. Michalek, B. C. Surjanhata, H. P. Parkman, J. R. Semler and B. Kuo Comparative analysis of phase III migrating motor complexes in stomach and small bowel using wireless motility capsule and antroduodenal manometry. Neurogastroenterol Motil. 2012; 24 (4): 332-e165. **No subjects with gastroparesis or constipation; other exclusion**

Brun, M., Michalek, W., McCallum, R., Koch, K. L., Sitrin, M. D., Wo, J. M., Hasler, W. L., Parkman, H. P., Semler, J. R., and Kuo, B. Comparison of small bowel postprandial response in healthy, gastroparetic and constipated subjects as measured by Wireless Motility Capsule (WMC). Gastroenterology. 2010; 138 (5): S459. **No appropriate comparison**

Brun, M., Michalek, W., Surjanhata, B., and Kuo, B. Small bowel transit time (Sbtt) by Wireless Motility Capsule (WMC): Normal values and analysis of pressure profiles in different subgroups of patients with slow sbtt. Gastroenterology. 2011; 140 (5): S865. **No appropriate comparison**

Brun, R., Michalek, W., and Kuo, B. Cephalic phase of small bowel fed response as measured by wireless motility capsule (WMC). Neurogastroenterol. Motil.. 2011; 23 15. **No appropriate comparison**

Brun, R., Surjanhata, B., and Kuo, B. PH profiles of gi tract by wireless motility capsule (WMC) in healthy (H), gastroparetics (GP) and constipated (C). Neurogastroenterol. Motil.. 2011; 23 15. **No appropriate comparison**

Brun, R., Surjanhata, B., Michalek, W., Baker, J. R., Wilding, G., Hasler, W., and Kuo, B. Mild and severe gastroparesis (gp) as defined by wireless motility capsule (wmc)-comparison of clinical characteristics and pressure profiles. Neurogastroenterol. Motil.. 2011; 23 37. **No appropriate comparison**

Buchanan, L. A., Reddy, S. C., Gray, M., Eversmann, J., and Wo, J. M. Motility parameters and luminal pH does not correlate with small intestinal bacterial overgrowth in patients with chronic idiopathic constipation. Gastroenterology. 2011; 140 (5): S813. **No appropriate comparison**

Bucur, M. C., Michalek, W., McCallum, R., Koch, K. L., Sitrin, M. D., Chey, W. D., Hasler, W. L., Katz, L. A., Parkman, H. P., Rao, S. S., Semler, J. R., and Kuo, B. The impact of using different standardized meals in the assessment of motility of upper gastrointestinal tract. Gastroenterology. 2009; 136 (5): A781. **No appropriate comparison**; **no outcome of interest**

Cassilly, D., Kantor, S., Knight, L. C., Maurer, A. H., Fisher, R. S., Semler, J., and Parkman, H. P. Gastric emptying of a non-digestible solid: assessment with simultaneous SmartPill pH and pressure capsule, antroduodenal manometry, gastric emptying scintigraphy. Neurogastroenterol Motil. 2008; 20 (4): 311-9. **Does not apply to key question**; **other exclusion**

Chaw, C. S., Yazaki, E., and Evans, D. F. The effect of pH change on the gastric emptying of liquids measured by electrical impedance tomography and pH-sensitive radiotelemetry capsule. Int J Pharm. 2001; 227 (1-2): 167-75. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Chen, H. B., Huang, Y., Chen, S. Y., Song, H. W., Li, X. L., Dai, D. L., Xie, J. T., He, S., Zhao, Y. Y., Huang, C., Zhang, S. J., and Yang, L. N. Small bowel preparations for capsule endoscopy with mannitol and simethicone: a prospective, randomized, clinical trial. J Clin Gastroenterol. 2011; 45 (4): 337-41. **Not wireless motility capsule**; **no appropriate comparison**

Dukes, G., Barton, M., Stephens, K., Haberer, L., Richards, D., Loehrer, F., Yuan, J., Verbeke, K., Hobson, A., Young, M., and Williams, P. Pharmacokinetics, safety/tolerability, and effect on gastric emptying of the oral motilin receptor agonist, GSK1322888, in healthy male Caucasian and Japanese Asian volunteers. Neurogastroenterol. Motil.. 2011; 23 45. **No appropriate comparison**

Endo, H., Matsuhashi, N., Inamori, M., Ohya, T., Iida, H., Mawatari, H., Nozaki, Y., Yoneda, K., Akiyama, T., Fujita, K., Takahashi, H., Yoneda, M., Abe, Y., Kobayashi, N., Kirikoshi, H., Kubota, K., Saito, S., and Nakajima, A. Abdominal surgery affects small bowel transit time and completeness of capsule endoscopy. Dig Dis Sci. 2009; 54 (5): 1066-70. **Not wireless motility capsule**

Farrar, J. T., Berkley, C., and Zworykin, V. K. Telemetering of intraenteric pressure in man by an externally energized wireless capsule. Science. 60; 131 (3416): 1814. **No original data Not wireless motility capsule**; **no appropriate comparison**

Fernandez-Urien, I., Borobio, E., Elizalde, I., Irisarri, R., Vila, J. J., Urman, J. M., and Jimenez, J. Z-line examination by the PillCam SB: prospective comparison of three ingestion protocols. World J Gastroenterol. 2010; 16 (1): 63-8. **Not wireless motility capsule**

Ferreira, F., Bastos, P., Cardoso, H., Nunes, A. C., and Macedo, G. Retention of endoscopic capsule in an umbilical hernia. Endoscopy. 2011; 43 Suppl 2 UCTN E111-2. **Not wireless motility capsule**

Gao, Y. J., Ge, Z. Z., Chen, H. Y., Li, X. B., Dai, J., Ye, C. A., and Xiao, S. D. Endoscopic capsule placement improves the completion rate of small-bowel capsule endoscopy and increases diagnostic yield. Gastrointest Endosc. 2010; 72 (1): 103-8. **Not wireless motility capsule**

Gelfond, D., Wilding, G., Semler, J. R., O'Hara, T., and Borowitz, D. Reproducibility of proximal small intestinal pH profiles in patients with cystic finbrosis and controls. Pediatr. Pulmonol.. 2010; 45 425. **No appropriate comparison**

Girelli, C. M., Maiero, S., Porta, P., and Cannizzaro, R. Small bowel capsule endoscopy performance in octogenarians: a case-control study. J Gerontol A Biol Sci Med Sci. 2011; 66 (1): 68-73. **Not wireless motility capsule**

Gray, M., Reddy, S. C., Falkner, K. C., Buchanan, L. A., Eversmann, J., Cave, M. C., Dryden, G. W., and Wo, J. M. Gut hormone profile is altered in patients with chronic idiopathic constipation. Gastroenterology. 2011; 140 (5): S479. **No outcome of interest Other exclusion**

Guerrero, R., Lara, L. F., and Browning, J. D. A case of diarrhea, ataxia, and capsule endoscope retention. Dig Dis Sci. 2007; 52 (11): 3174-7. **No subjects with gastroparesis or constipation Not wireless motility capsule**

Hasler, W. L., Coleski, R., Chey, W. D., Koch, K. L., McCallum, R. W., Wo, J. M., Kuo, B., Sitrin, M. D., Katz, L. A., Hwang, J., Semler, J. R., and Parkman, H. P. Differences in intragastric pH in diabetic vs. idiopathic gastroparesis: relation to degree of gastric retention. Am J Physiol Gastrointest Liver Physiol. 2008; 294 (6): G1384-91. **No appropriate comparison**; **no outcome of interest**

Hasler, W. L., Kuo, B., Gudleski, G. D., Lackner, J. M., and Baker, J. Relation of wireless motility capsule gastric emptying times and gastrointestinal pressure parameters to symptom reports in gastroparesis: The search for a motor cause of symptoms. Gastroenterology. 2011; 140 (5): S803. **No appropriate comparison**

Hasler, W. L., McCallum, R., Rao, S. S., Paulson, J. A., Koch, K. L., Sitrin, M. D., Saad, R. J., Chey, W. D., DiBaise, J. K., Parkman, H. P., Kuo, B., and Semler, J. R. Region-specific motor patterns and pH profiles in unprepared human colon quantified by simultaneous radiography and wireless capsule measurements. Gastroenterology. 2009; 136 (5): A225-A226. **Does not apply to key question**

Hasler, W. L., Parkman, H., Rao, S., Chey, W. D., Mccallum, R., Kuo, B., Koch, K., Sitrin, M., and Semler, J. R. Efficacy of colon propulsion in health and constipation measured by wireless motility capsules: Role of associated IBS and relation to colon contractile activity. Neurogastroenterol. Motil.. 2010; 22 8. **No subjects with gastroparesis or constipation; no appropriate comparison**

Hasler, W. L., Rao, S. S., Parkman, H. P., Saad, R. J., Chey, W. D., McCallum, R., Kuo, B., Koch, K. L., Sitrin, M. D., DiBaise, J. K., Rohde, B., and Semler, J. R. Bristol stool form in slow transit constipation correlates inversely with regional colon contractile activity measured by a wireless motility capsule. Gastroenterology. 2010; 138 (5): S628. **No appropriate comparison**

Hejazi, R., Reddymasu, S., Semler, J., and McCallum, R. Postprandial gastric motility parameters assessed by the wireless motility capsule method are complimentary to gastric transit time measurement for the diagnosis of gastroparesis. Am. J. Gastroenterol.. 2011; 106 S515. **No appropriate comparison**

Huang, B., Yan, G., Zan, P., and Li, Q. Study on gastric interdigestive pressure activity based on phase space reconstruction and FastICA algorithm. Med Eng Phys. 2009; 31 (3): 320-7. **No original data**; **no subjects with gastroparesis or constipation**

Iddan, G., Meron, G., Glukhovsky, A., and Swain, P. Wireless capsule endoscopy. Nature. 2000; 405 (6785): 417. **No original data**; **no appropriate comparison**

Iida, H., Endo, H., Sekino, Y., Sakai, E., Uchiyama, T., Ozono, K., Fujiwara, K., Hosono, M., Nonaka, T., Sakamoto, Y., Fujita, K., Yoneda, M., Koide, T., Takahashi, H., Tokoro, C., Goto, A., Abe, Y., Gotoh, E., Maeda, S., Nakajima, A., and Inamori, M. A New Non-Invasive Modality for Recording Sequential Images and the pH of the Small Bowel. Hepatogastroenterology. 2011; 59 (114): **No subjects with gastroparesis or constipation Not wireless motility capsule**

Kalantzis, C., Triantafyllou, K., Papadopoulos, A. A., Alexandrakis, G., Rokkas, T., Kalantzis, N., and Ladas, S. D. Effect of three bowel preparations on video-capsule endoscopy gastric and small-bowel transit time and completeness of the examination. Scand J Gastroenterol. 2007; 42 (9): 1120-6. **Not wireless motility capsule**

Katsinelos, P., Tziomalos, K., Fasoulas, K., Paroutoglou, G., Koufokotsios, A., Mimidis, K., Terzoudis, S., Maris, T., Beltsis, A., Geros, C., and Chatzimavroudis, G. Can capsule endoscopy be used as a diagnostic tool in the evaluation of nonbleeding indications in daily clinical practice? A prospective study. Med Princ Pract. 2011; 20 (4): 362-7. **Not wireless motility capsule**

Kelley, S. R. and Lohr, J. M. Retained wireless video enteroscopy capsule: a case report and review of the literature. J Surg Educ. 2009; 66 (5): 296-300. **No original data**; **not wireless motility capsule**

Kloetzer, L., Kuo, B., and Semler, J. The discriminative ability of the smartpill test in defining motility dysfunction in upper GI tract. Neurogastroenterol. Motil.. 2009; 21 6-7. **No appropriate comparison**

Liao, Z., Gao, R., Li, F., Xu, C., Zhou, Y., Wang, J. S., and Li, Z. S. Fields of applications, diagnostic yields and findings of OMOM capsule endoscopy in 2400 Chinese patients. World J Gastroenterol. 2010; 16 (21): 2669-76. **Not wireless motility capsule**

Magdeburg, R., Riester, T., Hummel, F., Lohr, M., Post, S., and Sturm, J. Ileus secondary to wireless capsule enteroscopy. Int J Colorectal Dis. 2006; 21 (6): 610-3. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Maqbool, S., Parkman, H. P., and Friedenberg, F. K. Wireless capsule motility: comparison of the SmartPill GI monitoring system with scintigraphy for measuring whole gut transit. Dig Dis Sci. 2009; 54 (10): 2167-74. **Does not apply to key question Other exclusion**

Meduri, K., Attaluri, A., Valestin, J., Schey, R., and Rao, S. S. Is small bowel and colonic pH altered in small intestinal bacterial overgrowth?. Gastroenterology. 2011; 140 (5): S532. **No appropriate comparison**

Michalek, W. and Kuo, B. Analysis of upper GI migrating motor complexes using invasive and non-invasive techniques. Neurogastroenterol. Motil.. 2010; 22 64-65. **No subjects with gastroparesis or constipation; no appropriate comparison**

Michalek, W., Bucur, M. C., McCallum, R., Koch, K. L., Sitrin, M. D., Chey, W. D., Hasler, W. L., Parkman, H. P., Rao, S. S., Semler, J. R., and Kuo, B. A comparison of small bowel pH profiles in healthy subjects and patients with gastroparesis as measured by a non-invasive wireless capsule. Gastroenterology. 2009; 136 (5): A683-A684. **No appropriate comparison**

Michalek, W., Bucur, M. C., McCallum, R., Koch, K. L., Sitrin, M. D., Chey, W. D., Hasler, W. L., Parkman, H. P., Rao, S. S., Semler, J. R., and Kuo, B. Impact of age on upper gastrointestinal function in healthy and gastroparetic populations, as measured by a non-invasive wireless capsule. Gastroenterology. 2009; 136 (5): A144. **No appropriate comparison**

Michalek, W., Chang, K., and Kuo, B. Spectral analysis of GI motility comparing various gastric regions. Neurogastroenterol. Motil.. 2010; 22 64. **No appropriate comparison**

Michalek, W., Neuman, S., Kloetzer, L., Foy, C., Semler, J. R., and Kuo, B. Impact of acid suppression on upper gastrointestinal function as measured by a non-invasive wireless pH and motility capsule. Gastroenterology. 2009; 136 (5): A186-A187. **No appropriate comparison**

Michalek, W., Parkman, H. P., Rohde, B., Buckley, P. E., Powers, J., Semler, J. R., and Kuo, B. Measuring gastric contractility during the fed and fasting state: Invasive versus non-invasive comparison. Gastroenterology. 2010; 138 (5): S467-S468. **No appropriate comparison**; **no outcome of interest**

Michalek, W., Parkman, H. P., Rohde, B., Buckley, P. E., Powers, J., Semler, J. R., and Kuo, B. Spectral analysis of the dominant frequency of upper GI motility-assessment of invasive versus non-invasive techniques. Gastroenterology. 2010; 138 (5): S467. **No subjects with gastroparesis or constipation**

Michalek, W., Parkman, H., Rhode, B., Buckley, P., Powers, J., Semler, J., and Kuo, B. Optimal pressure thresholds for UGI motility assessment: Invasive vs non-invasive techniques. Neurogastroenterol. Motil.. 2010; 22 65. **No appropriate comparison**

Michalek, W., Semler, J. R., and Kuo, B. Impact of acid suppression on upper gastrointestinal pH and motility. Dig Dis Sci. 2011; 56 (6): 1735-42. **Does not apply to key question**; **other exclusion**

Mikolajczyk, A., Surma, B., and Rubin, D. Assessment of tandem measurements of PH and total gut transit time in healthy volunteers. Am. J. Gastroenterol.. 2011; 106 S502-S503. **No appropriate comparison**

Mojaverian, P., Reynolds, J. C., Ouyang, A., Wirth, F., Kellner, P. E., and Vlasses, P. H. Mechanism of gastric emptying of a nondisintegrating radiotelemetry capsule in man. Pharm Res. 91; 8 (1): 97-100. **No appropriate comparison**

Monkemuller, K., Olano, C., Fry, L. C., and Ulbricht, L. J. Small-bowel endoscopy. Endoscopy. 2009; 41 (10): 872-7. **No original data; not wireless motility capsule**

Monthira, M., Saab, R., Hasler, W., Kuo, B., and Chey, W. D. Do circadian changes in colonic motility differ between healthy volunteers and patients with chronic constipation? Insights yielded by a noninvasive, wireless pH and motility capsule. Neurogastroenterol. Motil.. 2009; 21 37. **No appropriate comparison**; **no outcome of interest**

Mreyoud, A., Rozov, I., Moore, J., Wilding, G. E., Khawam, E., Lackner, J. M., Semler, J. R., and Sitrin, M. D. Assessment of drug effects on gastric emptying and contractility using wireless capsule manometry. Gastroenterology. 2009; 136 (5): A536. **No subjects with gastroparesis or constipation; no appropriate comparison**

Mungan, Z., Pinarbasi, B., Akyuz, F., Bektas, H., and Akyuz, A. Wireless endoscopy capsule remaining safely for a long time. Dig Dis Sci. 2008; 53 (5): 1422-3. **Not wireless motility capsule**

Nagula, S., Jarnagin, W. R., O'Reilly, E. M., and Schattner, M. A. Capsule-induced small-bowel obstruction during video capsule endoscopy in a patient with carcinomatosis. Dig Dis Sci. 2010; 55 (6): 1778-80. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Nakaji, K. Retrieval of impacted capsule endoscopy at the cricopharyngeus. Dig Endosc. 2010; 22 (1): 76. **Not wireless motility capsule**

Nakamura, M., Ohmiya, N., Miyahara, R., Ando, T., Watanabe, O., Kawashima, H., Itoh, A., Hirooka, Y., Niwa, Y., and Goto, H. Are symptomatic changes in irritable bowel syndrome correlated with the capsule endoscopy transit time? A pilot study using the 5-HT4 receptor agonist mosapride. Hepatogastroenterology. 2011; 58 (106): 453-8. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Nakamura, M., Ohmiya, N., Shirai, O., Takenaka, H., Kenji, Morishima, Miyahara, R., Ando, T., Watanabe, O., Kawashima, H., Itoh, A., Hirooka, Y., Niwa, Y., and Goto, H. Advance of video capsule endoscopy and the detection of anatomic landmarks. Hepatogastroenterology. 2009; 56 (96): 1600-5. **Not wireless motility capsule**

Nathan, S. R. and Biernat, L. Aspiration--an important complication of small-bowel video capsule endoscopy. Endoscopy. 2007; 39 Suppl 1 E343. **Not wireless motility capsule**

Ogata, H., Kumai, K., Imaeda, H., Aiura, K., Hisamatsu, T., Okamoto, S., Iwao, Y., Sugino, Y., Kitajima, M., and Hibi, T. Clinical impact of a newly developed capsule endoscope: usefulness of a real-time image viewer for gastric transit abnormality. J Gastroenterol. 2008; 43 (3): 186-92. **No subjects with gastroparesis or constipation ; not wireless motility capsule**

Pallotta, N., Fiorino, G., Romeo, E., Cesarini, M., Ciccantelli, B., Vincoli, G., Vernia, P., Carabotti, M., Cucchiara, S., and Corazziari, E. Different segmental transit time (TT) through the small bowel May affect wireless capsule (WC) endoscopy. Gastroenterology. 2009; 136 (5): A350. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Parkman, H. P. Assessment of gastric emptying and small-bowel motility: scintigraphy, breath tests, manometry, and SmartPill. Gastrointest Endosc Clin N Am. 2009; 19 (1): 49-55, vi. **No original data**

Parkman, H. P., Pizzuto, C., Semler, J., and Kuo Assessment of gastric contractility with wireless capsule motility: use of short 5 min intervals. Neurogastroenterol. Motil.. 2009; 21 74-75. **No appropriate comparison**

Pastore, S., Gortani, G., Maschio, M., Di Leo, G., and Ventura, A. Two lumens, one diagnosis. J Pediatr. 2011; 159 (3): 511. **Not wireless motility capsule ; not adult**

Purdy, M., Heikkinen, M., Juvonen, P., Voutilainen, M., and Eskelinen, M. Characteristics of patients with a retained wireless capsule endoscope (WCE) necessitating laparotomy for removal of the capsule. In Vivo. 2011; 25 (4): 707-10. **Not wireless motility capsule**

Qasim, A., Ryan, B., Breslin, N., and O'Morain, C. Gastric retention and wireless capsule endoscopy in adults: a modified technique for direct duodenal deployment. Gut. 2010; 59 (7): 1004-5; author reply 1005. **Not wireless motility capsule ; not adult**

Qian, J. M. [Pay attention to the complications encountered in capsule endoscopy]. Zhonghua Nei Ke Za Zhi. 2008; 47 (1): 3. **No original data; not wireless motility capsule**

Rao, S. S. C., Valestin, J., and Semler, J. Can wireless motility capsule (WMC) recording distinguish patients with dyssynergic defecation from non-dyssynergic constipation?. Neurogastroenterol. Motil.. 2011; 23 22. **No appropriate comparison**

Rauch, S., Krueger, K., Turan, A., and Roewer, N. Gastric emptying in critically ill trauma patients using a novel motility capsule. Eur. J. Anaesthesiol.. 2009; 26 170. **No appropriate comparison**

Rauch, S., Krueger, K., Turan, A., Roewer, N., and Sessler, D. I. Clinical experience in the placement of a novel motility capsule by using a capsule delivery device in critical care patients. Endoscopy. 2010; 42 Suppl 2 E77-8. **No original data**; **no appropriate comparison**

Reddy, S. C., Buchanan, L. A., Gray, M., Eversmann, J., Wright, R., and Wo, J. M. Effects on segmental GI transit and physiologic parameters by lubiprostone in patients with chronic idiopathic constipation. Gastroenterology. 2011; 140 (5): S31. **Not wireless motility capsule; no appropriate comparison**

Repici, A., Barbon, V., De Angelis, C., Luigiano, C., De Caro, G., Hervoso, C., Danese, S., Preatoni, P., Pagano, N., Comunale, S., Pennazio, M., and Rizzetto, M. Acute small-bowel perforation secondary to capsule endoscopy. Gastrointest Endosc. 2008; 67 (1): 180-3. **Not wireless motility capsule**

Ringel-Kulka, T., Maier, D. M., DeMaria, N., Galanko, J., Jackson, J., Fedor-Hammonds, L., and Ringel, Y. Alterations in intestinal transit in subgroups of patients with functional bowel disorders and healthy controls - A wireless motility capsule study. Gastroenterology. 2010; 138 (5): S626. **No appropriate comparison**

Ringel-Kulka, T., Siddle, J. P., Maier, D. M., Galanko, J. A., Semler, J. R., and Ringel, Y. Intestinal fermentation assessed by intraluminal pH in subjects with abdominal bloating. Gastroenterology. 2011; 140 (5): S709. **No subjects with gastroparesis or constipation**

Rogers, A. M., Kuperman, E., Puleo, F. J., and Shope, T. R. Intestinal obstruction by capsule endoscopy in a patient with radiation enteritis. JSLS. 2008; 12 (1): 85-7. **Not wireless motility capsule; no outcome of interest**

Saad, R. J., Chey, W. D., Rao, S. S., Hasler, W. L., Katz, L. A., Koch, K. L., Kuo, B., Lackner, J. M., Parkman, H. P., McCallum, R., Miller, C., Sarosiek, I., Semler, J., Sitrin, M. D., and Wilding, G. E. Reduced stool frequency does not predict colonic and whole gut transit in constipated patients. Gastroenterology. 2009; 136 (5): A373. **Other exclusion**

Saad, R. J., Semler, J. R., Wilding, G. E., and Chey, W. D. The effect of age on regional and whole gut transit times in healthy adults. Gastroenterology. 2010; 138 (5): S127. **No subjects with gastroparesis or constipation; no appropriate comparison**

Saad, R. J., Wilding, G. E., Semler, J. R., and Chey, W. D. Obesity is associated with changes in gastrointestinal and colonic transit in constipated but not healthy adults. Neurogastroenterol. Motil.. 2011; 23 22. **No appropriate comparison**

Sachdeva, P., Kantor, S., Knight, L. C., Maurer, A. H., Fisher, R. S., and Parkman, H. P. Use of a high caloric liquid meal (Ensure Plus) as a alternative meal for gastric emptying scintigraphy. Gastroenterology. 2010; 138 (5): S715-S716. **No subjects with gastroparesis or constipation; no outcome of interest**

Said, E. M. Capsule endoscopy in a district general hospital. BMJ. 2008; 337 a905. **Not wireless motility capsule**

Sarosiek, I., Alvarez, A., Romero, R., Semler, J., and McCallum, R. W. Prolonged cecal residence time identified by wireless technology: A new symptoms explantation for some patients with chronic constipation. Neurogastroenterol. Motil.. 2011; 23 22-23. **Not wireless motility capsule**; **no appropriate comparison**

Sarosiek, I., Rao, S., Koch, K. L., Parkman, H. P., Sarosiek, J., Semler, J., and McCallum, R. W. Identification of cecal residence time using wireless technology: A new concept pertaining to constipation and delayed colon transit. Neurogastroenterol. Motil.. 2009; 21 25. **No appropriate comparison**; **other exclusion**

Sarosiek, I., Sochacka, B., Roeser, K., Sarosiek, J., and McCallum, R. Does small intestinal bacterial overgrowth affect pH readings as recorded by wireless motility capsule technology in the GI tract?. Gastroenterology. 2010; 138 (5): S669. **No appropriate comparison**; **no outcome of interest**

Sarosiek, I., Sochacka, B., Roeser, K., Sarosiek, J., and Mccallum, R. W. Influence of small intestinal bacterial overgrowth on motility index parameters and transit time recorded by wireless motility capsule technology. Neurogastroenterol. Motil.. 2010; 22 27-28. **No appropriate comparison**

Schnoll-Sussman, F. Achieving complete small-bowel capsule endoscopy: is it possible and does it matter?. Gastrointest Endosc. 2010; 72 (1): 109-11. **No original data Not wireless motility capsule**

Shiff, A. D., Gurudu, S., Decker, G. A., and Leighton, J. A. False-positive wireless video capsule secondary to performing a simultaneous sigmoidoscopy. Am J Gastroenterol. 2009; 104 (4): 1070. **Not wireless motility capsule**

Sidhu, R. and McAlindon, M. E. Age should not be a barrier to performing capsule endoscopy in the elderly with anaemia. Dig Dis Sci. 2011; 56 (8): 2497-8. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Sidhu, R., Sanders, D. S., Kapur, K., Hurlstone, D. P., and McAlindon, M. E. Capsule endoscopy changes patient management in routine clinical practice. Dig Dis Sci. 2007; 52 (5): 1382-6. **Not wireless motility capsule**

Tacheci, I., Ryska, A., Rejchrt, S., Kopacova, M., Horava, V., and Bures, J. Spontaneous disintegration of a retained video capsule in a patient with cryptogenic multifocal ulcerous stenosing enteritis: a rare complication. Endoscopy. 2008; 40 Suppl 2 E104-5. **Not wireless motility capsule**

Tanimura, T., Adachi, K., Furuta, K., Ohara, S., Morita, T., Koshino, K., Miki, M., and Kinoshita, Y. Usefulness of catheterless radiotelemetry pH monitoring system to examine the relationship between duodenal acidity and upper gastrointestinal symptoms. J Gastroenterol Hepatol. 2011; 26 (1): 98-103. **Not wireless motility capsule**

Thorne, N., Culler, S., Griffin, L., Koch, K., and Long, J. D. Do patients with delayed transit constipation have a higher prevalence of delayed upper gut transit?. Neurogastroenterol. Motil.. 2010; 22 36-37. **No appropriate comparison**

Timm, D. A., Willis, H., Thomas, W., Willis, D., Sanders, L., Boileau, T., Holmberg, D., and Slavin, J. L. The use of a new wireless motility device (SmartPill(registered trademark)) for measurement of gastrointestinal transit time after dietary fiber intervention. Gastroenterology. 2010; 138 (5): S462. **No appropriate comparison**

Timm, D., Willis, H., Thomas, W., Sanders, L., Boileau, T., and Slavin, J. The use of a wireless motility device (SmartPill(R)) for the measurement of gastrointestinal transit time after a dietary fibre intervention. Br J Nutr. 2011; 105 (9): 1337-42. **Other exclusion**

Triantafyllou, K., Kalantzis, C., Papadopoulos, A. A., Apostolopoulos, P., Rokkas, T., Kalantzis, N., and Ladas, S. D. Video-capsule endoscopy gastric and small bowel transit time and completeness of the examination in patients with diabetes mellitus. Dig Liver Dis. 2007; 39 (6): 575-80. **Not wireless motility capsule**

Triantafyllou, K., Kalli, T., and Danias, N. G. Spontaneous resolution of capsule endoscope retention in a normal small bowel after 2.5 years. Endoscopy. 2010; 42 Suppl 2 E87-8. **Not wireless motility capsule**

Um, S., Poblete, H., and Zavotsky, J. Small bowel perforation caused by an impacted endocapsule. Endoscopy. 2008; 40 Suppl 2 E122-3. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Venecourt-Jackson, E. and Maharaj, I. A rare complication of wireless capsule endoscope. N Z Med J. 2009; 122 (1289): 81-4. **No original data**; **not wireless motility capsule**

Visser, L. and Lieshout, L. Unexpected cause of iron deficiency detected by capsule endoscopy. Neth J Med. 2009; 67 (9): 317; author reply 317. **No subjects with gastroparesis or constipation**

Wang, T. D. A novel capsule endoscope: do we need new kids on the block?. Gastrointest Endosc. 2009; 69 (2): 260-1. **No original data**

Ward, E. M., Devault, K. R., Bouras, E. P., Stark, M. E., Wolfsen, H. C., Davis, D. M., Nedrow, S. I., and Achem, S. R. Successful oesophageal pH monitoring with a catheter-free system. Aliment Pharmacol Ther. 2004; 19 (4): 449-54. **Not wireless motility capsule**

Watson, B. W., Meldrum, S. J., Riddle, H. C., Brown, R. L., and Sladen, G. E. pH profile of gut as measured by radiotelemetry capsule. Br Med J. 72; 2 (5805): 104-6. **No subjects with gastroparesis or constipation; not wireless motility capsule**

Williams, R. E. 3rd, Bauman, W. A., Spungen, A. M., Vinnakota, R. R., Farid, R. Z., Galea, M., and Korsten, M. A. SmartPill technology provides safe and effective assessment of gastrointestinal function in persons with spinal cord injury. Spinal Cord. 2012; 50 (1): 81-4. **Does not apply to key question**; **other exclusion**

Williams, R. E., Vinnakota, R. R., Dhungel, N., Farid, R. Z., Galea, M. D., Kothari, T. H., Spungen, A. M., Bauman, W., and Korsten, M. A. Gastroparesis in asymptomatic persons with paraplegia: Diagnosis made with smartpill(registered trademark) Technology. Gastroenterology. 2010; 138 (5): S345. **No appropriate comparison**

Williams, R. E., Vinnakota, R. R., Farid, R. Z., Dhungel, N., Galea, M. D., Kothari, T. H., Spungen, A. M., Bauman, W., and Korsten, M. A. Neurogenic bowel in persons with spinal cord injury: An evaluation using smartpill(registered trademark) technology. Gastroenterology. 2010; 138 (5): S587. **No appropriate comparison; no outcome of interest**

Willis, H. J., Thomas, W., Willis, D. J., and Slavin, J. L. Feasibility of measuring gastric emptying time, with a wireless motility device, after subjects consume fiber-matched liquid and solid breakfasts. Appetite. 2011; 57 (1): 38-44. **Does not apply to key question**; **other exclusion**

Zarate, N., Mohammed, S. D., O'Shaughnessy, E., Newell, M., Yazaki, E., Williams, N. S., Lunniss, P. J., Semler, J. R., and Scott, S. M. Accurate localization of a fall in pH within the ileocecal region: validation using a dual-scintigraphic technique. Am J Physiol Gastrointest Liver Physiol. 2010; 299 (6): G1276-86. **Does not apply to key question**; **other exclusion**

Zarate, N., Mohammed, S., O'Shaughnessy, E., Newell, M., Yazaki, E., Semler, J., and Scott, S. M. Accurate localisation of a fall in pH within the ileo-caecal region. Neurogastroenterol. Motil.. 2009; 21 43. **No subjects with gastroparesis or constipation; no appropriate comparison**

Appendix D: Evidence Tables

Table 1. Study design characteristics of studies evaluating the wireless motility capsule

Author, Year	Study design	Country	Start year of recruitment Location of recruitment Multi or single center	Length of followup (days) Length of time between tests	Type of patients included Normal/healthy patients included?	Inclusion criteria
Kuo, 2011[32]	Retrospective cohort, chart review	US	2007 Tertiary center Multi-center	Followup NR Simultaneous tests	Suspected constipation Suspected gastroparesis No	Patients undergoing WMC testing to exclude delayed gastric, small intestinal or colonic transit.
Rao, 2011[33]	Retrospective cohort, chart review	US	2007 Tertiary center Single center	Followup NR Simultaneous	Suspected constipation Suspected gastroparesis No	Reported symptoms suggestive of GI dysmotility for at least 6 mo and had normal upper endoscopy and/or colonoscopy, normal hematology and metabolic profiles, and normal abdominal ultrasound CAT scan evaluations. Patients with a history of appendectomy, cholecystectomy or cesarean section, or hysterectomy. No history of severe dysphagia, bezoars, GI obstruction, inflammatory bowel disease, and earlier gastrectomy or colectomy or other abdominal/pelvic surgeries.
Camilleri, 2010[28]	Prospective cohort	Multi including US	Start year NR Multi-center	2 Simultaneous	Known constipation No	18 to 80 years old, symptoms of chronic functional constipation for at least one year; self-reported hard stool at least 25% of the time w/ at least one of 6+ symptoms of functional constipation by Rome III criteria

Author, Year	Study design	Country	Start year of recruitment Location of recruitment Multi or single center	Length of followup (days) Length of time between tests	Type of patients included Normal/healthy patients included?	Inclusion criteria
Saad, 2010[42] [Sub-analysis of data[12]]	Prospective cohort, post hoc analysis[12]	US	Start year NR Tertiary center Multi-center	5 Simultaneous	Known constipation Yes	18+ years old, healthy people, chronically constipated with 2+ symptoms in past 12 months of: straining at defecation, lump/hard stools, sensation of incomplete evacuation all in at least quarter of the time, and/or three of fewer bowel movements per week. Healthy included no previous GI surgery other than uncomplicated appendectomy, cholecystectomy, or cesarean section
Hasler, 2009[41] [Subset of study[12]]	Prospective cohort	US	Start year NR Tertiary center Multi-center	Followup NR Simultaneous	Known constipation Yes	Self-reported constipated by Rome II Criteria for chronic functional constipation; at least 2/6 symptoms of constipation for at least 3 months; no patients with functional outlet obstruction with balloon expulsion time >60 s; no prior GI surgery other than appendectomy, cholecystectomy, or c-section; healthy patients had no GI symptoms on Mayo screening, not morbidly obese (BMI >35 kg/m^2), not on medications known to affect gut transit, no cardiovascular, endocrine, renal, or hepatic disease.
Rao, 2009[12]	Prospective cohort	US	Start year NR Tertiary center Multi-center	21 Simultaneous	Known constipation Yes	Constipated: fulfilled Rome II criteria for chronic functional constpiation and at least 2/6 symptoms of constipation, no previous abdominal surgery other than uncomplicated cholecystectomy or c-section; Healthy patients inclusion: screening with Mayo GI Disease questionnaire.

Author, Year	Study design	Country	Start year of recruitment Location of recruitment Multi or single center	Length of followup (days) Length of time between tests	Type of patients included Normal/healthy patients included?	Inclusion criteria
Kuo, 2008[11]	Prospective cohort	US	2005 Location NR Multi-center	3 Simultaneous	Known gastroparesis Yes	No patients with previous gastro-esophageal surgery except those with uncomplicated appendectomy and/or laparoscopic cholecystectomy. No patients with prescriptions for drugs such as birth control, antidepressants, antilipids that had changed in past 6 months, not pregnant. Healthy: between 18-65 with no GI disease according to the Mayo GI Disease Screening Questionnaire and no cardiovascular, endocrine, renal and chronic disease, have average bowel movement frequency of at least one per 48 h, no pregnancy, no surgery within the past 3 months, no clinical evidence of diverticulitis as evidenced by the absence of chronic or acute abdominal pain, no medications or over-the-counter agents that could influence GI motility, no tobacco use within 8 h before and after capsule ingestion, no alcohol use 24 h before capsule ingestion and during the monitoring period and a body mass index <35. Gastroparesis patients were Males and females between ages 18 and 65 years with history of nausea and vomiting, early satiety, epigastric pain or discomfort for at least 6 months and documented abnormal scintigraphy as defined by local medical centre standards within 2 years. Gastroparetics with excessively delayed GET (>90% of a standard egg meal retained after 2 h), average bowel movement frequencies exceeding 72 h, evidence of gastric bezoar within the last 3 years, stricture, peptic ulcer, severe dysphagia to solid food and pills, severe vomiting, severe abdominal pain, severe weight loss (>4.5 kg in last 2 months), or diabetes with a hemoglobin A1C >10 were excluded.

Author, Year	Study design	Country	Start year of recruitment Location of recruitment Multi or single center	Length of followup (days) Length of time between tests	Type of patients included Normal/healthy patients included?	Inclusion criteria
Brun, 2011[34]	Prospective cohort	US	Start year NR Tertiary center Center NR	Followup NR Simultaneous	Known gastroparesis Yes	NFS
Mysore, 2010[44]	Prospective cohort[33]	NR	Start year NR Tertiary center Center NR	5 Time between NR	Suspected constipation Suspected gastroparesis No	Symptoms of dysmotility
Mysore, 2010[45] [earlier version of study[33]]	Prospective cohort[33]	NR	Start year NR Tertiary center Center NR	5 Time between NR	Suspected constipation Suspected gastroparesis No	Symptoms of dysmotility
Lee, 2010[35]	Retrospective cohort	NR	Start year NR Tertiary center Single center	Followup NR Time between NR	Suspected constipation Suspected gastroparesis No	Not further specified
Reddymasu, 2010[36]	Prospective cohort	US	Start year NR Tertiary center Multi-center	Followup NR Simultaneous	Known gastroparesis Yes	Previously healthy; gastroparetic (defined as presence of abdominal pain, nausea, and vomiting with a previously documented delayed GES

Author, Year	Study design	Country	Start year of recruitment Location of recruitment Multi or single center	Length of followup (days) Length of time between tests	Type of patients included Normal/healthy patients included?	Inclusion criteria
Paulson, 2009[43]	Not specified	NR	NR	1 Time between NR	Known constipation Yes	Not further specified
Lee, 2009[37]	Retrospective cohort	US	Start year NR Tertiary center Single center	NR	Suspected constipation Suspected gastroparesis No	Patients who presented to single tertiary center for evaluation of potential GI dysmotilities
Rao, 2009[39]	Not specified	NR	NR	1 Time between NR	Known constipation Yes	Not further specified
Rao, 2009[40]	Prospective cohort, matched prospective cohort	NR	Start year NR Location NR Multi-center	1 Time between NA	Known constipation Yes	Over the age of 65
Lee, 2012[38]	Prospective cohort	US	2005 Tertiary center Multi-center	2 to 5 Simultaneous	Known gastroparesis No	Males and females between ages 18 and 65 years with history of nausea and vomiting, early satiety, epigastric pain or discomfort for at least 6 months and documented abnormal scintigraphy by local standards within 2 years were enrolled

Abbreviations: BMI = body mass index; GET = gastric emptying time; GI = gastrointestinal; h = hours; mo = month; NA = not applicable; NFS = not further specified; NR = not reported; s = seconds; US = United States

Table 2. Study population characteristics of studies evaluating the wireless motility capsule

Author, year	Population, N	Males (%), age in years	Race	Prior Testing N (%)	Blood sugar Smoking status Diabetes status Defecatory dysfunction	Prior use of prokinetics, narcotics, antidepressants, PPIs, laxatives
Kuo, 2011[32]	No comparison population, 83	17 (20.5), Mean: 43	NR	GES, 44 ROM, 16 Other, 48	Blood sugar NR Smoking NR Diabetes: 12 (14.6) Defecatory: 27	Prokinetics NR No narcotics 3 to 7 days prior Antidepressants NR No PPIs No laxatives
Rao, 2011[33]	Combined (UGI, LGI), 86	9, Mean: 44.5	W: 77 (89.5) AA: 4 (4.7)	GES: 36 ROM: 50	NR	Prokinetics: 14% UGI, 6% LGI Narcotics: 8% UGI, 6% LGI Antidepressants: 44% UGI, 30% LGI PPIs: 58% UGI, 12% LGI Laxatives: 19% UGI, 44% LGI
Camilleri, 2010[28]	Chronic constipation, 158	20, Mean: 42.5	W: (83) AA: (13) A: (2)	NR	NR	No prokinetics No narcotics No antidepressants No PPIs for 7 days No laxatives
Saad, 2010[42] [Sub-analysis of data[12]]	Chronic constipation, 46	4, Mean: 44	NR	NR	NR	No prokinetics for 48 hours Antidepressants stable dose No PPIs for 48 hours No laxatives for 48 hours

Author, year	Population, N	Males (%), age in years	Race	Prior Testing N (%)	Blood sugar Smoking status Diabetes status Defecatory dysfunction	Prior use of prokinetics, narcotics, antidepressants, PPIs, laxatives
Saad, 2010[42] [Sub-analysis of data[12]]	Healthy, 64	(47), Mean: 38	NR	NR	NR	NR
Hasler, 2009[41] [Subset of study[12]]	Constipation, 36	5, Mean: 47.4	NR	Anal balloon expulsion (100%)	Defecatory dysfunction: 0	No prokinetics for 2 days No narcotics for 7 days Antidepressants if ≥ 6 mo No PPIs for 7 days No laxatives for 2 days
Hasler, 2009[41] [Subset of study[12]]	Healthy, 53	27, Mean: 37.2	NR	NR	NR	No prokinetics for 2 days No narcotics for 7 days Antidepressants if ≥ 6 mo No PPIs for 7 days No laxatives
Rao, 2009[12]	Constipation, 78	9, Mean: 45	NR	NR	NR	No prokinetics for 48 hours Narcotics NR Antidepressants stable dose No PPIs for 48 hours No laxatives for 48 hours

Author, year	Population, N	Males (%), age in years	Race	Prior Testing N (%)	Blood sugar Smoking status Diabetes status Defecatory dysfunction	Prior use of prokinetics, narcotics, antidepressants, PPIs, laxatives
Rao, 2009[12]	Healthy, 87	47, Mean: 39	NR	NR	NR	No prokinetics for 48 hours Narcotics NR Antidepressants stable dose No PPIs for 48 hours No laxatives for 48 hours
Kuo, 2008[11]	Gastroparesis, 61	10, Age NR	W: 50 AA: 7 H: 4	Scintigraphy, 1	NR	NR
Kuo, 2008[11]	Healthy, 87	55, Age NR	W: 69 AA: 7 A: 5 H: 4	NA	NR	NR
Brun, 2011[34]	Gastroparesis, 87	NR	NR	GES (100)	NR	NR
Brun, 2011[34]	Healthy, 61	NR	NR	NR	NR	NR
Mysore, 2010[44]	Total, 86 (UGI: 11, LGI: 45, mixed: 30)	9, Range: 18 to 85	NR	Barium studies: 0.3, barium enema: 0.2	NR	NR
Mysore, 2010[45] [earlier version of study[33]]	Total, 71 (UGI: 6, LGI: 13, mixed: 22)	9, Range: 19 to 85	NR	NR	NR	NR
Lee, 2010[35]	Total, 50	NR	NR	NR	NR	NR
Reddymasu, 2010[36]	Gastroparesis, 41	8, Age NR	NR	NR	NR	NR
Reddymasu, 2010[36]	Healthy, 66	38, Age NR	NR	NR	NR	NR
Paulson, 2009[43]	Constipation, 32	7, Age NR	NR	NR	NR	NR
Paulson, 2009[43]	Healthy, 15	6, Age NR	NR	NR	NR	NR
Lee, 2009[37]	Total, 32	NR	NR	NR	NR	NR
Rao, 2009[39]	Constipation, 32	7, Mean: 49	NR	NR	NR	NR
Rao, 2009[39]	Healthy, 15	6, Mean: 45	NR	NR	NR	NR

Author, year	Population, N	Males (%), age in years	Race	Prior Testing N (%)	Blood sugar Smoking status Diabetes status Defecatory dysfunction	Prior use of prokinetics, narcotics, antidepressants, PPIs, laxatives
Rao, 2009[40]	Constipation, 10	5, Mean: 74	NR	NR	NR	NR
Rao, 2009[40]	Healthy, 12	6, Mean: 70	NR	NR	NR	NR
Lee, 2012[38]	Gastroparesis, 43	8 (18), Mean: 42	NR	GES: 43 (100)	Blood sugar NR Smoking status NR Diabetes: 16 (37.2) Defecatory dysfunction NR	No prokinetics for 3 days No narcotics for 3 days Antideppressants NR No PPIs for 3+ days prior Laxatives NR

Abbreviations: A= Asian; AA = African American; CTT = colon transit time; GES = gastric emptying scintigraphy; GET = gastric emptying time; GI = gastrointestinal; H = Hispanic; h = hours; kg = kilogram; LGI = lower gastrointestinal tract; mo = month; NR = not reported; PPI = proton pump inhibitor; ROM = radiopaque markers; UGI = upper gastrointestinal tract; W = white

Table 3. Diagnostic tests in studies evaluating wireless motility capsule

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Kuo, 2011[32]	Wireless motility capsule	Gastroparesis: Emptying time > 5 hours Constipation: Colonic transit time > 59 hours	Tobacco NR Prokinetics NR No narcotics Antidepressants allowed No PPIs No laxatives	Capsule swallowed Std meal NR Ensure NR
Rao, 2011[33]	Wireless motility capsule	Gastroparesis: They used standard criteria of > 5 hours abnormal (disregard above) Constipation: standard criteria of CTT > 59 hours	Tobacco NR Prokinetics NR No narcotics No antidepressants No PPIs No laxatives	Capsule swallowed Std meal: 255 kcal nutrition bar Ensure NR
Rao, 2011[33]	Gastric scintigraphy	Gastroparesis: greater than 10% retention at 4 hours (delayed gastric emptying)	Tobacco NR Prokinetics NR Narcotics NR Antidepressants NR PPIs NR Laxatives NR	NFS

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Rao, 2011[33]	Colonic scintigraphy	Constipation: Retention of 6 or more radiopaque markers at 120 hours was defined as abnormal colonic transit.	Tobacco NR Prokinetics NR Narcotics NR Antidepressants NR PPIs NR Laxatives NR	NFS
Camilleri, 2010[28]	Wireless motility capsule	Gastroparesis: > 5 hours Constipation: 59 hours	Tobacco NR No prokinetics No narcotics No antidepressants No PPIs No laxatives	Capsule swallowed Std meal: egg beaters Ensure given 6 h after test
Camilleri, 2011[28]	Radiopaque markers	Gastroparesis: > 5 hours Constipation: 67 hours	Tobacco NR No prokinetics No narcotics No antidepressants No PPIs No laxatives	24 ROM on 3 successive days X-ray day 4 (72 h after ingestion of first set) and day 7 (144 h after ingestion of first set) Type of counts: both segment and total colon

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Saad, 2010[42] [Sub-analysis of data[12]]	Wireless motility capsule	Constipation: based on 95th percentile of healthy control population	Tobacco NR No prokinetics Narcotics NR Antidepressants allowed No PPIs No laxatives	Capsule swallowed Std meal: SmartBar Ensure given 6 h after test
Saad, 2010[42] [Sub-analysis of data[12]]	Radiopaque markers	Constipation: delayed whole got transit defined as retention of >20% of ROM after 5 days	Tobacco NR No prokinetics Narcotics NR Antidepressants allowed No PPIs No laxatives	24 ROM in capsule X-ray 48 h after ingestion
Hasler, 2009[41] [Subset of study[12]]	Wireless motility capsule	Constipation: >59 hours transit time	Tobacco NR No prokinetics No narcotics Antidepressants allowed No PPIs No laxatives	Capsule swallowed Std meal: SmartBar Ensure given 6 h after test

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Hasler, 2009[41] [Subset of study[12]]	Radiopaque markers	Constipation: >59 hours transit time	Tobacco NR No prokinetics No narcotics Antidepressants allowed No PPIs No laxatives	24 ROM in capsule X-ray as needed Type of counts NR
Rao, 2009[12]	Wireless motility capsule	Constipation: based on 95th percentile of healthy control population as 59 hours for women and 44 hours for men	Tobacco NR No prokinetics Narcotics NR Antidepressants allowed No PPIs No laxatives	Capsule swallowed Std meal: SmartBar Ensure given 6 h after test
Rao, 2009[12]	Radiopaque markers	Constipation: based on 95th percentile of healthy control population as 59 hours for women and 44 hours for men	Tobacco NR No prokinetics Narcotics NR Antidepressants allowed No PPIs No laxatives	24 ROM in one capsule X-ray 48 h after ingestion and 120 h after ingestion and 21 days after ingestion Type of co unts NR

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Kuo, 2008[11]	Wireless motility capsule	Gastroparesis: Threshold not reported; abrupt pH rise (usually >3 pH units) from gastric baseline to a pH >4 as determined by software and 2 reviewers.	No tobacco for healthy Tobacco NR for gastroparetic No prokinetics No narcotics Antidepressants allowed No PPIs for gastroparetic No laxatives	Capsule swallowed Std meal: scrambled egg substitute, bread, strawberry jam, water Ensure given 6 h after test
Kuo, 2008[11]	Gastric scintigraphy 4h	Gastroparesis: >10% retained at 4h as determined by X-ray	No tobacco for healthy Tobacco NR for gastroparetic No prokinetics No narcotics Antidepressants allowed No PPIs for gastroparetic No laxatives	4-hour/Tougas duration Solid components used

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Kuo, 2008[11]	Gastric scintigraphy 2h	NR	No tobacco for healthy Tobacco NR for gastroparetic No prokinetics No narcotics Antidepressants allowed No PPIs for gastroparetic No laxatives	2-hour duration Solid components used
Brun, 2011[34]	Wireless motility capsule	Gastroparesis: NFS	NR	NR
Brun, 2011[34]	Gastric scintigraphy	Gastroparesis: NFS	NR	Radioactive meal Meal retention assessed at 2 h and 4 h
Mysore, 2010[44]	Wireless motility capsule	NR	NR	NR
Mysore, 2010[44]	Standard testing	NR	NR	NFS
Mysore, 2010[45] [earlier version of study[33]]	Wireless motility capsule	NR	NR	NR
Mysore, 2010[45] [earlier version of study[33]]	Gastric scintigraphy	NR	NR	NR
Mysore, 2010[45] [earlier version of study[33]]	Antroduodenal manometry	NR	NR	NR
Mysore, 2010[45] [earlier version of study[33]]	Colonic scintigraphy	NR	NR	NR
Mysore, 2010[45] [earlier version of study[33]]	Radiopaque markers	NR	NR	NR

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Lee, 2010[35]	Wireless motility capsule	NR	NR	NR
Lee, 2010[35]	Other diagnostic motility tests, including 4-hr gastric scintigraphy	NR	NR	Gastric scintigraphy: 4-hour/Tougas duration ROM: circles
Reddymasu, 2010[36]	Wireless motility capsule	Gastroparesis: (gastric cph <73 or frequency of gastric contractions >100 mmHg being less than 2/hour)	NR	NR
Reddymasu, 2010[36]	Gastric scintigraphy	Gastroparesis: abnormal if >10% of the radio-labeled meal was retained in the stomach at the end of 4 hours.	NR	NR
Paulson, 2009[43]	Wireless motility capsule	NR	NR	NR
Paulson, 2009[43]	Anal manometry	NR	NR	NR
Lee, 2009[37]	Wireless motility capsule	NR	NR	NR
Rao, 2009[39]	Wireless motility capsule	NR	NR	Capsule swallowed
Rao, 2009[39]	Radiopaque markers	NR	NR	NR
Rao, 2009[40]	Wireless motility capsule	NR	NR	Capsule swallowed Std meal: nutrient bar Ensure given 6 h after test

Author, year	Diagnostic test	Criteria used for constipation or gastroparesis	Use of tobacco, prokinetics, narcotics, antidepressants, PPIs, laxatives at test time?	Diagnostic test protocol
Lee, 2012[38]	Wireless motility capsule	Gastroparesis: 5 hours	Tobacco NR No prokinetics No narcotics Antidepressants NR No PPIs Laxatives NR	Capsule swallowed Std meal: 50 mL water Ensure given 6 h after test
Lee, 2012[38]	Gastric scintigraphy	Gastroparesis: <10% gastric retention at 4 h.	Tobacco NR No prokinetics No narcotics Antidepressants NR No PPIs Laxatives NR	Std meal: eggbeaters with markers 4-hour/Tougas duration Solid components given Meal retention assessed at 2 h and 4 h

Abbreviations: BMI = body mass index; CTT = colon transit time; GES = gastric emptying scintigraphy; GET = gastric emptying time; GI = gastrointestinal; h = hours; kg = kilogram; LGI = lower gastrointestinal tract; m = meter; mL = milliliter; NA = not applicable; NFS = not further specified; NR = not reported; PPI = proton pump inhibitor; ROM = radiopaque markers; Std = standardized; UGI = upper gastrointestinal tract; US = United States; WMC = wireless motility capsule

Table 4. Study quality of studies evaluating wireless motility capsule

Author, year	Healthy and normal excluded	Severely affected patients excluded	Random sample	Same reference standard	Were all patients included in the analysis	Blinding of investigators	Reasonable time between tests	Pre-established cut-off values	Stated aim diagnostic accuracy	Conflict of interest stated	Commercial/Industry support	Author employees of funder
Kuo, 2011[32]	Yes	Unclear	No	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	Unclear	Yes
Rao, 2011[33]	Yes	Yes	No	Unclear	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Camilleri, 2010[28]	No	Unclear	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Saad, 2010[42] [Sub-analysis of data[12]]	No	Unclear	No	Yes	No	Yes*	Yes	Yes	No	Yes	Yes	Yes
Hasler, 2009[41] [Subset of study[12]]	No	No	No	Yes	Yes	No	Unclear	Yes	Yes	Yes	Yes	Yes
Rao, 2009[12]	No	Unclear	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kuo, 2008[11]	No	yes	Unclear	Yes	No	Yes*	No	No	No	Yes	Yes	Yes
Brun, 2011[34]	No	Unclear	Unclear	Yes	Unclear	No	Yes	Unclear	No	No	Unclear	Unclear
Mysore, 2010[44]	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Unclear	No	No	Unclear	Unclear
Mysore, 2010[45] [earlier version of study[33]]	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	No	No	Unclear	Unclear
Lee, 2010[35]	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	No	Unclear	Unclear
Reddymasu, 2010[36]	No	Unclear	No	Yes	Unclear	No	Yes	Yes	Yes	No	Unclear	Unclear
Paulson, 2009[43]	No	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	no	No	Unclear	Unclear
Lee, 2009[37]	Yes	Unclear	No	Unclear	Yes	No	Unclear	Unclear	Yes	No	Unclear	Unclear

Author, year	Healthy and normal excluded	Severely affected patients excluded	Random sample	Same reference standard	Were all patients included in the analysis	Blinding of investigators	Reasonable time between tests	Pre-established cut-off values	Stated aim diagnostic accuracy	Conflict of interest stated	Commercial/Industry support	Author employees of funder
Rao, 2009[39]	No	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	No	No	Unclear	Unclear
Rao, 2009[40]	No	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	No	No	Unclear	Unclear
Lee, 2012[38]	Yes	Unclear	Unclear	No	No	Yes*	Yes	Yes	Yes	Yes	Unclear	Yes

*Article did not indicate blinding, but author was contacted via e-mail and confirmed blinding.