

## Randomized Control Trials

A: Allocation concealment

B: Blinding of outcome assessors

C: Blinding of participants and personnel

D: Incomplete outcome data

E: Other sources of bias

F: Selective outcome reporting

G: Sequence Generation

Study	THA	TKA	GA	NA	Patients	A	B	C	D	E	F	G
Aksoy 2014 <sup>1</sup>	THA				70	Unclear	Low	High	Low	Low	Low	Low
Amundson 2017 <sup>2</sup>		TKA	GA	NA	157	Low	Low	Low	Low	Low	Low	Low
Andersen 2012 <sup>3</sup>		TKA		NA	40	Low	Low	Low	Low	Low	Low	Low
Angers 2019 <sup>4</sup>		TKA	GA		90	Low	Low	Low	Low	Low	Low	Low
Ashraf 2013 <sup>5</sup>		TKA		NA	40	Low	Low	Low	Low	Low	Low	Unclear
Bali 2016 <sup>6</sup>		TKA	GA		68	Low	Low	High	Low	Low	Low	Low
Baranovi 2011 <sup>7</sup>		TKA		NA	71	Unclear	Unclear	Unclear	High	Low	Low	Low
Barrington 2005 <sup>8</sup>		TKA		NA	108	Low	High	High	Low	Low	Low	Low
Beausang 2016 <sup>9</sup>		TKA		NA	96	Unclear	High	High	Low	Low	Low	Unclear
Biswas 2018 <sup>10</sup>		TKA		NA	130	Low	Low	Low	Unclear	Low	Low	Low
Bogoch 2002 <sup>11</sup>	THA	TKA	GA		115	Low	Low	Low	Low	Low	Low	Unclear
Bron 2018 <sup>12</sup>	THA			NA	162	Low	Low	Low	Low	Low	Low	Unclear
Campbell 2008 <sup>13</sup>		TKA		NA	56	Unclear	Low	Unclear	High	Low	Low	Low
Chan 2013 <sup>14</sup>		TKA	GA	NA	135	Low	Low	High	Unclear	Low	Low	Low
Chan 2014 <sup>15</sup>		TKA			135	Unclear	Low	Unclear	Low	Low	Low	Unclear
Chaumeron 2013 <sup>16</sup>		TKA		NA	59	Low	Low	Low	Low	Low	Low	Low
Chelly 2001 <sup>17</sup>		TKA	GA	NA	92	High	Unclear	High	Low	Low	Low	Unclear

Chen 2017 <sup>18</sup>	THA	TKA	GA	90	Low	Low	Unclear	Low	Low	Low	Low
Fahs 2018 <sup>19</sup>	THA		GA	99	Low	Low	Unclear	Low	Low	Low	Low
Fan 2016 <sup>20</sup>		TKA	GA	157	Low	Low	Low	Low	Low	Low	Low
Fan 2017 <sup>21</sup>		TKA	GA	65	Unclear	Unclear	Unclear	Low	Low	Low	Unclear
Fenten 2018 <sup>22</sup>		TKA	NA	80	Low	Low	Low	Low	Low	Low	Low
Gasanova 2019 <sup>23</sup>	THA		GA	60	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
Gmez 2017 <sup>24</sup>		TKA	NA	574	Unclear	Unclear	Unclear	Low	Low	Low	Unclear
Good 2007 <sup>25</sup>		TKA		42	Low	Low	Low	Low	Low	Low	Unclear
Goytizolo 2016 <sup>26</sup>	THA		NA	90	Low	Low	Low	Low	Unclear	Low	Low
Goytizolo 2020 <sup>27</sup>		TKA	NA	111	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
Grosso 2018 <sup>28</sup>		TKA	NA	102	Low	Low	Low	Unclear	Low	Low	Low
Hua 2017 <sup>29</sup>	THA		GA	60	Unclear	Unclear	Unclear	High	Low	Low	Low
Johnson 2017 <sup>30</sup>	THA		GA NA	159	Low	Low	High	Low	Low	Low	Low
Kadic 2009 <sup>31</sup>		TKA	NA	53	Low	Low	Unclear	Low	Low	Low	Low
Kampitak 2018 <sup>32</sup>		TKA	NA	57	Low	Low	Low	Low	Low	Low	Low
Kardash 2007 <sup>33</sup>		TKA	NA	40	Unclear	Low	Low	Low	Low	Low	Unclear
Kayupov 2018 <sup>34</sup>		TKA	GA NA	91	Low	High	High	High	Unclear	Low	Low
Kearns 2016 <sup>35</sup>	THA		NA	108	Low	Low	Low	Low	Low	Low	Low
Kendrii 2017 <sup>36</sup>	THA		GA NA	30	Unclear	Unclear	Unclear	Low	Low	Low	Unclear
Kovalak 2015 <sup>37</sup>		TKA	NA	60	Low	Unclear	Unclear	Low	Low	Low	Low
Kratz 2015 <sup>38</sup>	THA		GA	52	Low	Low	High	High	Low	Low	Low
Kuchlik 2017 <sup>39</sup>	THA		NA	56	Low	Low	Low	Low	Low	Low	Low
Kulkarni 2019 <sup>40</sup>		TKA	NA	100	Low	Low	Low	Low	Low	Low	Low
Lee 2011 <sup>41</sup>		TKA	NA	78	Low	Low	Low	Low	Low	Low	Low
Lee 2012 <sup>42</sup>		TKA	GA	40	Unclear	Unclear	Unclear	Low	Low	Low	Unclear
Leung 2018 <sup>43</sup>		TKA	NA	70	Low	Low	Low	Low	Low	Low	Low
Li 2017 <sup>44</sup>		TKA		53	Low	Low	Low	Low	Low	Low	Low
Long 2006 <sup>45</sup>		TKA	NA	70	Unclear	Unclear	Unclear	High	Low	Unclear	Unclear
Lu 2017 <sup>46</sup>		TKA	GA NA	57	Unclear	Low	High	Low	Low	Low	Low
Luezner 2020 <sup>47</sup>		TKA		139	Low	Low	Low	Low	Low	Low	Low
Ivarez 2017 <sup>48</sup>		TKA	NA	39	High	High	High	Low	Low	Low	Low

Marino 2009 <sup>49</sup>	THA		NA	150	Low	High	Unclear	Low	Low	Low	Low
Mei 2017 <sup>50</sup>	THA		GA	132	Low	Low	Unclear	Low	Low	Unclear	Low
Moghtadaei 2014 <sup>51</sup>	TKA		NA	36	Low	Low	Low	Unclear	Low	Low	Low
Nader 2012 <sup>52</sup>	TKA		NA	62	Low	Unclear	Unclear	Low	Low	Low	Low
Ng 2001 <sup>53</sup>	TKA		GA	48	Low	Low	Low	Low	Low	Low	Low
Ng 2012 <sup>54</sup>	TKA		GA	32	Low	Low	Low	Low	Low	Low	Low
Nishio 2014 <sup>55</sup>	THA		GA NA	19	Low	Unclear	Unclear	Low	Low	Low	Low
Niskanen 2005 <sup>56</sup>	TKA		NA	50	Unclear	High	High	Low	Low	Low	Unclear
Peng 2014 <sup>57</sup>	TKA		GA	280	Low	Unclear	High	Low	Low	Low	Low
Reinhardt 2014 <sup>58</sup>	TKA		NA	94	Low	Low	Low	Low	Low	Low	Low
Rizk 2017 <sup>59</sup>	TKA		GA	75	Low	Unclear	Unclear	Low	Low	Low	Low
Safa 2014 <sup>60</sup>	TKA		NA	68	Low	Low	Low	Low	Low	Low	Low
Sahin 2014 <sup>61</sup>	TKA		NA	104	Low	Low	Low	Low	Low	Low	Low
Saine 2018 <sup>62</sup>	TKA		NA	60	Low	Low	Low	Low	Low	Low	Low
Seet 2006 <sup>63</sup>	TKA		NA	37	Low	Unclear	Unclear	Low	Low	Low	Unclear
Siddiqui 2007 <sup>64</sup>	THA		GA	34	Low	High	High	Low	Low	Low	Low
Singelyn 1998 <sup>65</sup>	TKA		GA NA	30	Low	Unclear	Unclear	Low	Low	Low	Low
Sites 2004 <sup>66</sup>	TKA		NA	40	Low	Unclear	Unclear	Low	Low	Low	Low
Sogbein 2017 <sup>67</sup>	TKA		NA	70	Low	Low	Low	Low	Low	Low	Low
Spangehl 2015 <sup>68</sup>	TKA		GA	160	Low	High	High	Low	Low	Low	Low
Stathellis 2017 <sup>69</sup>	TKA		GA	50	Low	Unclear	Unclear	Low	Low	Low	Low
Stevens 2000 <sup>70</sup>	THA		GA	60	Unclear	Unclear	Low	Low	Low	Low	Unclear
Sundarathiti 2009 <sup>71</sup>	TKA		NA	61	Unclear	Unclear	Unclear	Low	Low	Low	Unclear
Thybo 2016 <sup>72</sup>	THA		NA	100	Low	Low	Low	Unclear	Low	Low	Low
Toftdahl 2007 <sup>73</sup>	TKA		NA	77	Low	Unclear	Unclear	Low	Low	Low	Low
Tong 2019 <sup>74</sup>	TKA		NA	40	Low	Low	Low	Low	Low	Low	Low
Twyman 1990 <sup>75</sup>	THA		GA	20	Unclear	Unclear	Unclear	Low	High	Low	Unclear
Wall 2017 <sup>76</sup>	TKA		GA NA	257	Low	Low	Unclear	Unclear	Low	Unclear	Low
Wang 2019 <sup>77</sup>	TKA			90	Low	Low	Low	Low	Low	Low	Low
Widmer 2012 <sup>78</sup>	TKA		GA	55	Low	Low	Low	Low	Low	Low	Low
Wu 2014 <sup>79</sup>	TKA		NA	79	Low	High	High	Unclear	Low	Low	Low

Yamamoto 2019 <sup>80</sup>	THA		NA	53	Low	Low	Low	Low	Low	Low	Low
Zhou 2018 <sup>81</sup>		TKA	GA	40	Low	Low	Low	Low	Low	Low	Low
Zinkus 2017 <sup>82</sup>		TKA		NA	54	Low	Low	Low	Low	Low	Low

## Observational Studies

A: Failure to adequately control for confounding

B: Failure to develop and apply appropriate eligibility criteria

C: Flawed measurement of exposure or outcome

D: Incomplete follow-up

Study	Study Design	THA	TKA	GA	NA	Patients	A	B	C	D
Akkaya 2014 <sup>83</sup>	Case-control study		TKA		NA	27	High	Low	Low	High
Alsheik 2020 <sup>84</sup>	Retrospective cohort study		TKA	GA	NA	80	Unclear	Low	Low	Low
Antoni 2014 <sup>85</sup>	Retrospective cohort study		TKA	GA		98	High	High	Low	Low
Asakura 2011 <sup>86</sup>	Retrospective cohort study		TKA	GA		40	High	Low	Low	Low
Beaupre 2012 <sup>87</sup>	Prospective cohort study		TKA	GA	NA	39	High	Low	Low	Low
Cien 2015 <sup>88</sup>	Retrospective cohort study		TKA			122	Low	Low	Low	Low
Danninger 2014 <sup>89</sup>	Retrospective cohort study	THA	TKA	GA	NA	530,089	Unclear	Low	Unclear	Low
DeRuyter 2006 <sup>90</sup>	Prospective cohort study		TKA	GA	NA	50	High	Low	Unclear	Low
Duncan 2013 <sup>91</sup>	Retrospective cohort study		TKA	GA	NA	108	High	Unclear	Low	Low
Fetherston 2011 <sup>92</sup>	Prospective cohort study	THA	TKA			52	Unclear	Low	Low	Unclear
Fukuda 2020 <sup>93</sup>	Retrospective cohort study		TKA	GA		5,094	Low	Low	Low	Low
Green 2018 <sup>94</sup>	Retrospective cohort study	THA		GA		20	Unclear	Low	Low	Low
Gwam 2018 <sup>95</sup>	Retrospective cohort study		TKA			110	Unclear	Low	Low	Low
Henson 2019 <sup>96</sup>	Retrospective cohort study		TKA			144	Unclear	Low	Low	Low
Horn 2015 <sup>97</sup>	Retrospective cohort study		TKA			32	Unclear	Low	Low	High
Jacob 2011 <sup>98</sup>	Retrospective cohort study		TKA	GA	NA	8,590	Unclear	Low	Low	Low
Jacob 2011a <sup>99</sup>	Retrospective cohort study	THA				9,844	Unclear	Unclear	Low	Low
Kim 2012 <sup>100</sup>	Retrospective cohort study		TKA		NA	80	High	Low	Low	Low

Kinjo 2012 <sup>101</sup>	Prospective cohort study	TKA	GA	NA	81	Unclear	Low	Low	High	
Kirkness 2017 <sup>102</sup>	Retrospective cohort study	TKA	GA	NA	268	Low	Low	Low	Low	
Kukreja 2019 <sup>103</sup>	Retrospective cohort study	THA		NA	71	Low	Low	Low	Low	
Liu 2015 <sup>104</sup>	Retrospective cohort study	TKA		NA	1,768	Unclear	Low	Low	Low	
Lovald 2015 <sup>105</sup>	Retrospective cohort study	TKA	GA	NA	35,642	High	Low	Unclear	Unclear	
McIsaac 2017 <sup>106</sup>	Retrospective cohort study	TKA	GA	NA	178,214	Low	Low	Low	Low	
Memtsoudis 2016 <sup>107</sup>	Retrospective cohort study	TKA	GA	NA	719,426	Low	Low	Low	Low	
Memtsoudis 2016 <sup>107</sup>	Retrospective cohort study	THA	GA	NA	342,726	Low	Low	Low	Low	
Peters 2006 <sup>108</sup>	Retrospective cohort study	THA	TKA	GA	NA	100	High	High	Low	High
Pope 2015 <sup>109</sup>	Retrospective cohort study	TKA	GA	NA	294	High	Low	Low	Low	
Raimer 2007 <sup>110</sup>	Prospective cohort study	TKA	GA	NA	42	Unclear	Low	Low	High	
Rajeev 2016 <sup>111</sup>	Prospective cohort study	TKA	GA	NA	114	High	High	Low	Low	
Rames 2019 <sup>112</sup>	Retrospective cohort study	TKA			693	Low	Low	Low	Low	
Roberts 2019 <sup>113</sup>	Retrospective cohort study	TKA			236	Low	Low	Low	Low	
Schmidt 2009 <sup>114</sup>	Retrospective cohort study	TKA	GA	NA	200	Unclear	Unclear	Low	Low	
Schwab 2019 <sup>115</sup>	Retrospective cohort study	TKA			224	Unclear	Low	Low	Low	
Simonsen 2011 <sup>116</sup>	Prospective cohort study	TKA		NA	67	Unclear	High	Low	Low	
Singelyn 1999 <sup>117</sup>	Prospective cohort study	THA	GA	NA	1,274	High	Low	Low	Low	
Sporer 2016 <sup>118</sup>	Retrospective cohort study	TKA		NA	597	Unclear	Low	Low	Low	
Sugar 2011 <sup>119</sup>	Prospective cohort study	TKA		NA	28	Unclear	Low	Low	Low	
Suthersan 2015 <sup>120</sup>	Prospective cohort study	TKA	GA	NA	46	Unclear	Low	Low	Low	
Tetsunaga 2016 <sup>121</sup>	Retrospective cohort study	THA	GA		62	High	High	Low	Low	
Willett 2019 <sup>122</sup>	Retrospective cohort study	TKA			151	High	Low	Low	Low	

## References

- 1 Aksoy M, Dostbil A, Ince I, et al. Continuous spinal anaesthesia versus ultrasound-guided combined psoas compartment-sciatic nerve block for hip replacement surgery in elderly high-risk patients: a prospective randomised study. *BMC Anesthesiol* 2014; **14**: 99
- 2 Amundson AW, Johnson RL, Abdel MP, et al. A Three-arm Randomized Clinical Trial Comparing Continuous Femoral Plus Single-injection Sciatic Peripheral Nerve Blocks versus Periarticular Injection with Ropivacaine or Liposomal Bupivacaine for Patients Undergoing Total Knee Arthroplasty. *Anesthesiology* 2017; **126**: 1139-50
- 3 Andersen HL, Gyrn J, Moller L, Christensen B, Zaric D. Continuous saphenous nerve block as supplement to single-dose local infiltration analgesia for postoperative pain management after total knee arthroplasty. *Reg Anesth Pain Med* 2012; **37**
- 4 Angers M, Belzile É L, Vachon J, Beauchamp-Chalifour P, Pelet S. Negative Influence of femoral nerve block on quadriceps strength recovery following total knee replacement: A prospective randomized trial. *Orthop Traumatol Surg Res* 2019; **105**: 633-7
- 5 Ashraf A, Raut VV, Canty SJ, McLauchlan GJ. Pain control after primary total knee replacement. A prospective randomised controlled trial of local infiltration versus single shot femoral nerve block. *The Knee* 2013; **20**: 324-7
- 6 Bali C, Ozmete O, Eker HE, Hersekli MA, Aribogan A. Postoperative analgesic efficacy of fascia iliaca block versus periarticular injection for total knee arthroplasty. *J Clin Anesth* 2016; **35**: 404-10
- 7 Baranovic S, Maldini B, Milosevic M, Golubic R, Nikolic T. Peripheral regional analgesia with femoral catheter versus intravenous patient controlled analgesia after total knee arthroplasty: a prospective randomized study. *Coll Antropol* 2011; **35**: 1209-14
- 8 Barrington MJ, Olive D, Low K, Scott DA, Brittain J, Choong P. Continuous femoral nerve blockade or epidural analgesia after total knee replacement: a prospective randomized controlled trial. *Anesth Analg* 2005; **101**: 1824-9
- 9 Beausang DH, Pozek JP, Chen AF, et al. A Randomized Controlled Trial Comparing Adductor Canal Catheter and Intraarticular Catheter After Primary Total Knee Arthroplasty. *The Journal of arthroplasty* 2016; **31**: 298-301
- 10 Biswas A, Perlas A, Ghosh M, et al. Relative Contributions of Adductor Canal Block and Intrathecal Morphine to Analgesia and Functional Recovery After Total Knee Arthroplasty: A Randomized Controlled Trial. *Reg Anesth Pain Med* 2018; **43**: 154-60
- 11 Bogoch ER, Henke M, Mackenzie T, Olschewski E, Mahomed NN. Lumbar paravertebral nerve block in the management of pain after total hip and knee arthroplasty: a randomized controlled clinical trial. *The Journal of arthroplasty* 2002; **17**: 398-401
- 12 Bron JL, Verhart J, Sierevelt IN, De Vries D, Kingma HJ, Rademakers MV. No effect of double nerve block of the lateral cutaneous nerve and subcostal nerves in total hip arthroplasty: A randomized controlled trial. *Acta Orthop* 2018; **89**: 272-7
- 13 Campbell A, McCormick M, McKinlay K, Scott NB. Epidural vs. lumbar plexus infusions following total knee arthroplasty: randomized controlled trial. *Eur J Anaesthesiol* 2008; **25**: 502-7
- 14 Chan EY, Fransen M, Sathappan S, Chua NH, Chan YH, Chua N. Comparing the analgesia effects of single-injection and continuous femoral nerve blocks with patient controlled analgesia after total knee arthroplasty. *The Journal of arthroplasty* 2013; **28**: 608-13
- 15 Chan EY, Teo YH, Assam PN, Fransen M. Functional discharge readiness and mobility following total knee arthroplasty for osteoarthritis: a comparison of analgesic techniques. *Arthritis Care Res* 2014; **66**: 1688-94
- 16 Chaumeron A, Audy D, Drolet P, Lavigne M, Vendittoli PA. Periarticular injection in knee arthroplasty improves quadriceps function knee. *Clin Orthop* 2013; **471**: 2284-95

- 17 Chelly JE, Greger J, Gebhard R, et al. Continuous femoral blocks improve recovery and outcome of patients undergoing total knee arthroplasty. *J Arthroplasty* 2001; **16**: 436-45
- 18 Chen C, Li M, Wang K, et al. Protective effect of combined general and regional anesthesia on postoperative cognitive function in older arthroplasty patients. *Int J Clin Exp Med* 2017; **10**: 15453-8
- 19 Fahs AM, Koueiter DM, Kurdziel MD, Huynh KA, Perry CR, Verner JJ. Psoas Compartment Block vs Periarticular Local Anesthetic Infiltration for Pain Management After Anterior Total Hip Arthroplasty: A Prospective, Randomized Study. *The Journal of arthroplasty* 2018
- 20 Fan L, Yu X, Zan P, Liu J, Ji T, Li G. Comparison of Local Infiltration Analgesia With Femoral Nerve Block for Total Knee Arthroplasty: A Prospective, Randomized Clinical Trial. *The Journal of arthroplasty* 2016; **31**: 1361-5
- 21 Fan R, Zhao L, Hong H. Effect of inhalation anesthesia combined with nerve block on improving postoperative cognitive function in elderly orthopedic patients. *Biomedical Research (India)* 2017; **28**: 4485-9
- 22 Fenten MGE, Bakker SMK, Scheffer GJ, Wymenga AB, Stienstra R, Heesterbeek PJC. Femoral nerve catheter vs local infiltration for analgesia in fast track total knee arthroplasty: short-term and long-term outcomes. *Br J Anaesth* 2018; **121**: 850-8
- 23 Gasanova I, Alexander JC, Estrera K, et al. Ultrasound-guided suprainguinal fascia iliaca compartment block versus periarticular infiltration for pain management after total hip arthroplasty: a randomized controlled trial. *Reg Anesth Pain Med* 2019; **44**: 206-11
- 24 Ortiz-Gómez JR, Perepérez-Candel M, Vázquez-Torres JM, et al. Postoperative analgesia for elective total knee arthroplasty under subarachnoid anesthesia with opioids: Comparison between epidural, femoral block and adductor canal block techniques (with and without perineural adjuvants). Aprospective, randomized, clinical trial. *Minerva Anesthesiol* 2017; **83**: 50-8
- 25 Good RP, Snedden MH, Schieber FC, Polachek A. Effects of a preoperative femoral nerve block on pain management and rehabilitation after total knee arthroplasty. *American journal of orthopedics (Belle Mead, NJ)* 2007; **36**: 554-7
- 26 Goytizolo EA, Stundner O, Rúa SH, et al. The Effect of Regional Analgesia on Vascular Tone in Hip Arthroplasty Patients. *HSS journal : the musculoskeletal journal of Hospital for Special Surgery* 2016; **12**: 125-31
- 27 Goytizolo EA, Lin Y, Kim DH, et al. Addition of Adductor Canal Block to Periarticular Injection for Total Knee Replacement: A Randomized Trial. *J Bone Joint Surg Am* 2019; **101**: 812-20
- 28 Grosso MJ, Murtaugh T, Lakra A, et al. Adductor Canal Block Compared with Periarticular Bupivacaine Injection for Total Knee Arthroplasty: A Prospective Randomized Trial. *J Bone Joint Surg Am* 2018; **100**: 1141-6
- 29 Hua X, Hu Y, Chen D, Xiao Y, Luo L. Efficacy and safety of ultrasound-guided fascia iliaca compartment block using dexmedetomidine combined with ropivacaine in aged patients undergoing hip replacement. *Int J Clin Exp Med* 2017; **10**: 16484-91
- 30 Johnson RL, Amundson AW, Abdel MP, et al. Continuous Posterior Lumbar Plexus Nerve Block Versus Periarticular Injection with Ropivacaine or Liposomal Bupivacaine for Total Hip Arthroplasty: A Three-Arm Randomized Clinical Trial. *The Journal of bone and joint surgery American volume* 2017; **99**: 1836-45
- 31 Kadic L, Boonstra MC, MC DEWM, Lako SJ, J VANE, Driessen JJ. Continuous femoral nerve block after total knee arthroplasty? *Acta Anaesthesiol Scand* 2009; **53**: 914-20

- 32 Kampitak W, Tanavalee A, Ngarmukos S, Amarase C, Songthamwat B, Boonshua A. Comparison of Adductor Canal Block Versus Local Infiltration Analgesia on Postoperative Pain and Functional Outcome after Total Knee Arthroplasty: A Randomized Controlled Trial. *Malaysian orthopaedic journal* 2018; **12**: 7-14
- 33 Kardash K, Hickey D, Tessler MJ, Payne S, Zukor D, Velly AM. Obturator versus femoral nerve block for analgesia after total knee arthroplasty. *Anesth Analg* 2007; **105**: 853-8
- 34 Kayupov E, Okroj K, Young AC, et al. Continuous Adductor Canal Blocks Provide Superior Ambulation and Pain Control Compared to Epidural Analgesia for Primary Knee Arthroplasty: A Randomized, Controlled Trial. *J Arthroplasty* 2018; **33**: 1040-4.e1
- 35 Kearns R, Macfarlane A, Grant A, et al. A randomised, controlled, double blind, non-inferiority trial of ultrasound-guided fascia iliaca block vs. spinal morphine for analgesia after primary hip arthroplasty. *Anaesthesia* 2016; **71**: 1431-40
- 36 Kendrišić M, Šurbatović M, Djordjević D, Trifunović B, Jevdjić J. Analgesic efficacy and safety of four different anesthesia/postoperative analgesia protocols in patients following total hip arthroplasty. *Vojnosanit Pregl* 2017; **74**: 814-20
- 37 Kovalak E, Doğan AT, Üzümcügil O, et al. A comparison of continuous femoral nerve block and periarticular local infiltration analgesia in the management of early period pain developing after total knee arthroplasty. *Acta orthopaedica et traumatologica turcica* 2015; **49**: 260-6
- 38 Kratz T, Dette F, Schmitt J, Wiesmann T, Wulf H, Zoremba M. Impact of regional femoral nerve block during general anesthesia for hip arthroplasty on blood pressure, heart rate and pain control: A randomized controlled study. *Technology and health care : official journal of the European Society for Engineering and Medicine* 2015; **28**: 257-62
- 39 Kuchálik J, Magnuson A, Lundin A, Gupta A. Local infiltration analgesia or femoral nerve block for postoperative pain management in patients undergoing total hip arthroplasty. A randomized, double-blind study. *Scandinavian journal of pain* 2017; **16**: 223-30
- 40 Kulkarni MM, Dadheech AN, Wakankar HM, Ganjewar NV, Hedgire SS, Pandit HG. Randomized Prospective Comparative Study of Adductor Canal Block vs Periarticular Infiltration on Early Functional Outcome After Unilateral Total Knee Arthroplasty. *J Arthroplasty* 2019; **34**: 2360-4
- 41 Lee AR, Choi DH, Ko JS, et al. Effect of combined single-injection femoral nerve block and patient-controlled epidural analgesia in patients undergoing total knee replacement. *Yonsei Med J* 2011; **52**: 145-50
- 42 Lee JJ, Choi SS, Lee MK, Lim BG, Hur W. Effect of continuous psoas compartment block and intravenous patient controlled analgesia on postoperative pain control after total knee arthroplasty. *Korean J Anesthesiol* 2012; **62**: 47-51
- 43 Leung P, Dickerson DM, Denduluri SK, et al. Postoperative continuous adductor canal block for total knee arthroplasty improves pain and functional recovery: A randomized controlled clinical trial. *J Clin Anesth* 2018; **49**: 46-52
- 44 Li D, Tan Z, Kang P, Shen B, Pei F. Effects of multi-site infiltration analgesia on pain management and early rehabilitation compared with femoral nerve or adductor canal block for patients undergoing total knee arthroplasty: a prospective randomized controlled trial. *Int Orthop* 2017; **41**: 75-83
- 45 Long WT, Ward SR, Dorr LD, Raya J, Boutary M, Sirianni LE. Postoperative pain management following total knee arthroplasty: a randomized comparison of continuous epidural versus femoral nerve infusion. *The journal of knee surgery* 2006; **19**: 137-43
- 46 Lu Y, Huang HM, Yan J, Jiang H. Comparison of postoperative femoral nerve block, epidural block and intravenous patient-controlled analgesia in pain control and postoperative rehabilitation after total knee arthroplasty. *Int J Clin Exp Med* 2017; **10**: 6680-7



- 47 Lutzner J, Gehring R, Beyer F. Slightly better pain relief but more frequently motor blockade with combined nerve block analgesia compared to continuous intraarticular analgesia after total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc* 2020; **28**: 1169-76
- 48 Alvarez NER, Ledesma RJG, Hamaji A, Hamaji MWM, Vieira JE. Continuous femoral nerve blockade and single-shot sciatic nerve block promotes better analgesia and lower bleeding for total knee arthroplasty compared to intrathecal morphine: a randomized trial. *BMC Anesthesiol* 2017; **17**: 64
- 49 Marino J, Russo J, Kenny M, Herenstein R, Livote E, Chelly JE. Continuous lumbar plexus block for postoperative pain control after total hip arthroplasty: a randomized controlled trial. *JBJS* 2009; **91**: 29-37
- 50 Mei B, Zha H, Lu X, et al. Peripheral Nerve Block as a Supplement to Light or Deep General Anesthesia in Elderly Patients Receiving Total Hip Arthroplasty: A Prospective Randomized Study. *The Clinical journal of pain* 2017; **33**: 1053-9
- 51 Moghtadaei M, Farahini H, Faiz SH, Mokarami F, Safari S. Pain Management for Total Knee Arthroplasty: Single-Injection Femoral Nerve Block versus Local Infiltration Analgesia. *Iranian Red Crescent medical journal* 2014; **16**: e13247
- 52 Nader A, Kendall MC, Wixson RL, Chung B, Polakow LM, McCarthy RJ. A randomized trial of epidural analgesia followed by continuous femoral analgesia compared with oral opioid analgesia on short- and long-term functional recovery after total knee replacement. *Pain medicine (Malden, Mass)* 2012; **13**: 937-47
- 53 Ng HP, Cheong KF, Lim A, Lim J, Puhaindran ME. Intraoperative single-shot "3-in-1" femoral nerve block with ropivacaine 0.25%, ropivacaine 0.5% or bupivacaine 0.25% provides comparable 48-hr analgesia after unilateral total knee replacement. *Canadian journal of anaesthesia = Journal canadien d'anesthesie* 2001; **48**: 1102-8
- 54 Ng FY, Ng JK, Chiu KY, Yan CH, Chan CW. Multimodal periarticular injection vs continuous femoral nerve block after total knee arthroplasty: a prospective, crossover, randomized clinical trial. *The Journal of arthroplasty* 2012; **27**: 1234-8
- 55 Nishio S, Fukunishi S, Juichi M, et al. Comparison of continuous femoral nerve block, caudal epidural block, and intravenous patient-controlled analgesia in pain control after total hip arthroplasty: a prospective randomized study. *Orthopedic reviews* 2014; **6**
- 56 Niskanen RO, Strandberg N. Bedside femoral block performed on the first postoperative day after unilateral total knee arthroplasty: a randomized study of 49 patients. *The journal of knee surgery* 2005; **18**: 192-6
- 57 Peng L, Ren L, Qin P, et al. Continuous Femoral Nerve Block versus Intravenous Patient Controlled Analgesia for Knee Mobility and Long-Term Pain in Patients Receiving Total Knee Replacement: A Randomized Controlled Trial. *Evidence-based complementary and alternative medicine : eCAM* 2014; **2014**: 569107
- 58 Reinhardt KR, Duggal S, Umunna BP, et al. Intraarticular analgesia versus epidural plus femoral nerve block after TKA: a randomized, double-blind trial. *Clin Orthop* 2014; **472**: 1400-8
- 59 Rizk H, Hosni Y, Abdeldayem S. Combined adductor canal and sciatic nerve block compared with local intraarticular infiltration analgesia for total knee arthroplasty: A prospective blinded randomized controlled study. *Current Orthopaedic Practice* 2017; **28**: 179-83
- 60 Safa B, Gollish J, Haslam L, McCartney CJ. Comparing the effects of single shot sciatic nerve block versus posterior capsule local anesthetic infiltration on analgesia and functional outcome after total knee arthroplasty: a prospective, randomized, double-blinded, controlled trial. *The Journal of arthroplasty* 2014; **29**: 1149-53

- 61 Sahin L, Korkmaz HF, Sahin M, Atalan G. Ultrasound-guided single-injection femoral nerve block provides effective analgesia after total knee arthroplasty up to 48 hours. *Agri : Agri (Algoloji) Dernegi'nin Yayin organidir = The journal of the Turkish Society of Algology* 2014; **26**: 113-8
- 62 Rousseau-Saine N, Williams SR, Girard F, et al. The Effect of Adductor Canal Block on Knee Extensor Muscle Strength 6 Weeks After Total Knee Arthroplasty: A Randomized, Controlled Trial. *Anesth Analg* 2018; **126**: 1019-27
- 63 Seet E, Leong WL, Yeo AS, Fook-Chong S. Effectiveness of 3-in-1 continuous femoral block of differing concentrations compared to patient controlled intravenous morphine for post total knee arthroplasty analgesia and knee rehabilitation. *Anaesth Intensive Care* 2006; **34**: 25-30
- 64 Siddiqui ZI, Cepeda MS, Denman W, Schumann R, Carr DB. Continuous Lumbar Plexus Block Provides Improved Analgesia With Fewer Side Effects Compared With Systemic Opioids After Hip Arthroplasty: A Randomized Controlled Trial. *Reg Anesth Pain Med* 2007; **32**: 393-8
- 65 Singelyn FJ, Deyaert M, Joris D, Pendeville E, Gouverneur JM. Effects of intravenous patient-controlled analgesia with morphine, continuous epidural analgesia, and continuous three-in-one block on postoperative pain and knee rehabilitation after unilateral total knee arthroplasty. *Anesth Analg* 1998; **87**: 88-92
- 66 Sites BD, Beach M, Gallagher JD, Jarrett RA, Sparks MB, Lundberg CJ. A single injection ultrasound-assisted femoral nerve block provides side effect-sparing analgesia when compared with intrathecal morphine in patients undergoing total knee arthroplasty. *Anesth Analg* 2004; **99**: 1539-43; table of contents
- 67 Sogbein OA, Sondekoppam RV, Bryant D, et al. Ultrasound-Guided Motor-Sparing Knee Blocks for Postoperative Analgesia Following Total Knee Arthroplasty: A Randomized Blinded Study. *The Journal of bone and joint surgery American volume* 2017; **99**: 1274-81
- 68 Spangehl MJ, Clarke HD, Hentz JG, Misra L, Blocher JL, Seamans DP. The Chitranjan Ranawat Award: Periarticular injections and femoral & sciatic blocks provide similar pain relief after TKA: a randomized clinical trial. *Clin Orthop* 2015; **473**: 45-53
- 69 Stathellis A, Fitz W, Schnurr C, et al. Periarticular injections with continuous perfusion of local anaesthetics provide better pain relief and better function compared to femoral and sciatic blocks after TKA: a randomized clinical trial. *Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA* 2017; **25**: 2702-7
- 70 Stevens RD, Van Gessel E, Flory N, Fournier R, Gamulin Z. Lumbar plexus block reduces pain and blood loss associated with total hip arthroplasty. *Anesthesiology* 2000; **93**: 115-21
- 71 Sundarathiti P, Ruananukul N, Channum T, et al. A comparison of continuous femoral nerve block (CFNB) and continuous epidural infusion (CEI) in postoperative analgesia and knee rehabilitation after total knee arthroplasty (TKA). *Journal of the Medical Association of Thailand = Chotmaihet thangphaet* 2009; **92**: 328-34
- 72 Thybo KH, Schmidt H, Hägi-Pedersen D. Effect of lateral femoral cutaneous nerve-block on pain after total hip arthroplasty: a randomised, blinded, placebo-controlled trial. *BMC anesthesiology* 2016; **16**: 21
- 73 Toftdahl K, Nikolajsen L, Haraldsted V, Madsen F, Tønnesen EK, Søballe K. Comparison of peri- and intraarticular analgesia with femoral nerve block after total knee arthroplasty: a randomized clinical trial. *Acta Orthop* 2007; **78**: 172-9
- 74 Tong QJ, Lim YC, Tham HM. Comparing adductor canal block with local infiltration analgesia in total knee arthroplasty: A prospective, blinded and randomized clinical trial. *J Clin Anesth* 2018; **46**: 39-43
- 75 Twyman R, Kirwan T, Fennelly M. Blood loss reduced during hip arthroplasty by lumbar plexus block. *The Journal of bone and joint surgery British volume* 1990; **72**: 770-1

- 76 Wall PDH, Parsons NR, Parsons H, et al. A pragmatic randomised controlled trial comparing the efficacy of a femoral nerve block and periarticular infiltration for early pain relief following total knee arthroplasty. *The bone & joint journal* 2017; **99-B**: 904-11
- 77 Wang Q, Yue Y, Li D, Yang Z, Yeersheng R, Kang P. Efficacy of Single-Shot Adductor Canal Block Combined With Posterior Capsular Infiltration on Postoperative Pain and Functional Outcome After Total Knee Arthroplasty: A Prospective, Double-Blind, Randomized Controlled Study. *J Arthroplasty* 2019; **34**: 1650-5
- 78 Widmer BJ, Scholes CJ, Pattullo GG, Oussedik SI, Parker DA, Coolican MR. Is femoral nerve block necessary during total knee arthroplasty?: a randomized controlled trial. *J Arthroplasty* 2012; **27**: 1800-5
- 79 Wu JW, Wong YC. Elective unilateral total knee replacement using continuous femoral nerve blockade versus conventional patient-controlled analgesia: perioperative patient management based on a multidisciplinary pathway. *Hong Kong medical journal = Xianggang yi xue za zhi* 2014; **20**: 45-51
- 80 Yamamoto N, Sakura S, Noda T, et al. Comparison of the postoperative analgesic efficacies of intravenous acetaminophen and fascia iliaca compartment block in hip fracture surgery: A randomised controlled trial. *Injury* 2019; **50**: 1689-93
- 81 Zhou M, Ding H, Ke J. Adductor canal block in combination with posterior capsular infiltration on the pain control after TKA. *Ir J Med Sci* 2018; **187**: 465-71
- 82 Zinkus J, Mockutė L, Gelmanas A, Tamošiūnas R, Vertelis A, Macas A. Comparison of 2 Analgesia Modalities in Total Knee Replacement Surgery: Is There an Effect on Knee Function Rehabilitation? *Medical science monitor : international medical journal of experimental and clinical research* 2017; **23**: 3019-25
- 83 Akkaya A, Tekelioglu UY, Demirhan A, et al. Ultrasound-guided femoral and sciatic nerve blocks combined with sedoanalgesia versus spinal anesthesia in total knee arthroplasty. *Korean J Anesthesiol* 2014; **67**: 90-5
- 84 Alsheikh KA, Alkhelaifi AS, Alharbi MK, et al. Adductor canal blockade versus continuous epidural analgesia after total knee joint replacement: A retrospective cohort study. *Saudi journal of anaesthesia* 2020; **14**: 38-43
- 85 Antoni M, Jenny JY, Noll E. Postoperative pain control by intra-articular local anesthesia versus femoral nerve block following total knee arthroplasty: impact on discharge. *Orthopaedics & traumatology, surgery & research : OTSR* 2014; **100**: 313-6
- 86 Asakura Y, Tsuchiya H, Mori H, Yano T, Kanayama Y, Takagi H. Reduction of the incidence of development of venous thromboembolism by ultrasound-guided femoral nerve block in total knee arthroplasty. *Korean journal of anesthesiology* 2011; **61**: 382-7
- 87 Beaupre LA, Johnston DB, Dieleman S, Tsui B. Impact of a preemptive multimodal analgesia plus femoral nerve blockade protocol on rehabilitation, hospital length of stay, and postoperative analgesia after primary total knee arthroplasty: a controlled clinical pilot study. *ScientificWorldJournal* 2012; **2012**: 273821
- 88 Cien AJ, Penny PC, Horn BJ, Popovich JM, Taunt CJ. Comparison Between Liposomal Bupivacaine and Femoral Nerve Block in Patients Undergoing Primary Total Knee Arthroplasty. *J Surg Orthop Adv* 2015; **24**: 225-9
- 89 Danninger T, Rasul R, Poeran J, et al. Blood transfusions in total hip and knee arthroplasty: an analysis of outcomes. *ScientificWorldJournal* 2014; **2014**: 623460
- 90 De Ruyter ML, Brueilly KE, Harrison BA, Greengrass RA, Putzke JD, Brodersen MP. A pilot study on continuous femoral perineural catheter for analgesia after total knee arthroplasty: the effect on physical rehabilitation and outcomes. *J Arthroplasty* 2006; **21**: 1111-7

- 91 Duncan CM, Moeschler SM, Horlocker TT, Hanssen AD, Hebl JR. A self-paired comparison of perioperative outcomes before and after implementation of a clinical pathway in patients undergoing total knee arthroplasty. *Reg Anesth Pain Med* 2013; **38**: 533-8
- 92 Fetherston CM, Ward S. Relationships between post operative pain management and short term functional mobility in total knee arthroplasty patients with a femoral nerve catheter: a preliminary study. *J Orthop Surg* 2011; **6**: 7
- 93 Fukuda T, Imai S, Simoda S, Nakdera M, Horiguchi H. Comparison of peripheral nerve block with local infiltration analgesia regarding walking ability after total knee replacement: A retrospective, propensity-score matched-pair cohort study. *J Orthop Surg (Hong Kong)* 2020; **28**: 2309499020931656
- 94 Stuart Green M, Ryan Hoffman C, Iqbal U, Olabisi Ives O, Hurd B. Transmuscular Quadratus Lumborum Block Reduces Length of Stay in Patients Receiving Total Hip Arthroplasty. *Anesth Pain Med* 2018; **8**: e80233
- 95 Gwam CU, Mistry JB, Richards IV, et al. Does Addition of Adductor Canal Blockade to Multimodal Periarticular Analgesia Improve Discharge Status, Pain Levels, Opioid Use, and Length of Stay after Total Knee Arthroplasty? *The journal of knee surgery* 2018; **31**: 184-8
- 96 Henson KS, Thomley JE, Lowrie LJ, Walker D. Comparison of Selected Outcomes Associated with Two Postoperative Analgesic Approaches in Patients Undergoing Total Knee Arthroplasty. *AANA J* 2019; **87**: 51-7
- 97 Horn BJ, Cien A, Reeves NP, Pathak P, Taunt CJ. Femoral Nerve Block vs Periarticular Bupivacaine Liposome Injection After Primary Total Knee Arthroplasty: Effect on Patient Outcomes. *The Journal of the American Osteopathic Association* 2015; **115**: 714-9
- 98 Jacob AK, Mantilla CB, Sviggum HP, Schroeder DR, Pagnano MW, Hebl JR. Perioperative nerve injury after total knee arthroplasty: regional anesthesia risk during a 20-year cohort study. *Anesthesiology* 2011; **114**: 311-7
- 99 Jacob AK, Mantilla CB, Sviggum HP, Schroeder DR, Pagnano MW, Hebl JR. Perioperative nerve injury after total hip arthroplasty: regional anesthesia risk during a 20-year cohort study. *Anesthesiology* 2011; **115**: 1172-8
- 100 Kim JH, Cho MR, Kim SO, Kim JE, Lee DK, Roh WS. A comparison of femoral/sciatic nerve block with lateral femoral cutaneous nerve block and combined spinal epidural anesthesia for total knee replacement arthroplasty. *Korean journal of anesthesiology* 2012; **62**: 448-53
- 101 Kinjo S, Lim E, Sands LP, Bozic KJ, Leung JM. Does using a femoral nerve block for total knee replacement decrease postoperative delirium? *BMC Anesthesiol* 2012; **12**: 4
- 102 Kirkness CS, Ren J, Asche CV. Significant improvement of mobility recovery in acute care patients after total knee arthroplasty with liposomal bupivacaine injectable suspension. *Journal of Acute Care Physical Therapy* 2017; **8**: 11-9
- 103 Kukreja P, MacBeth L, Sturdivant A, et al. Anterior quadratus lumborum block analgesia for total hip arthroplasty: a randomized, controlled study. *Reg Anesth Pain Med* 2019
- 104 Liu Q, Chelly JE, Williams JP, Gold MS. Impact of peripheral nerve block with low dose local anesthetics on analgesia and functional outcomes following total knee arthroplasty: a retrospective study. *Pain Med* 2015; **16**: 998-1006
- 105 Lovald ST, Ong KL, Lau EC, Joshi GP, Kurtz SM, Malkani AL. Readmission and Complications for Catheter and Injection Femoral Nerve Block Administration After Total Knee Arthroplasty in the Medicare Population. *The Journal of arthroplasty* 2015; **30**: 2076-81
- 106 Mclsaac DI, McCartney CJ, Walraven CV. Peripheral Nerve Blockade for Primary Total Knee Arthroplasty: A Population-based Cohort Study of Outcomes and Resource Utilization. *Anesthesiology* 2017; **126**: 312-20

- 107 Memtsoudis SG, Poeran J, Cozowicz C, Zubizarreta N, Ozbek U, Mazumdar M. The impact of peripheral nerve blocks on perioperative outcome in hip and knee arthroplasty—a population-based study. *Pain* 2016; **157**: 2341-9
- 108 Peters CL, Shirley B, Erickson J. The effect of a new multimodal perioperative anesthetic regimen on postoperative pain, side effects, rehabilitation, and length of hospital stay after total joint arthroplasty. *The Journal of arthroplasty* 2006; **21**: 132-8
- 109 Pope D, El-Othmani MM, Manning BT, Sepula M, Markwell SJ, Saleh KJ. Impact of Age, Gender and Anesthesia Modality on Post-Operative Pain in Total Knee Arthroplasty Patients. *Iowa Orthop J* 2015; **35**: 92-8
- 110 Raimer C, Priem K, Wiese AA, et al. Continuous psoas and sciatic block after knee arthroplasty: good effects compared to epidural analgesia or i.v. opioid analgesia: a prospective study of 63 patients. *Acta Orthop* 2007; **78**: 193-200
- 111 Rajeev A, Tumia N, Karn K, Kashyap S, Mayne D. Postoperative pain relief and functional outcome following total knee arthroplasty - a prospective comparative audit of three analgesic regimes. *Acta Orthop Belg* 2016; **82**: 265-70
- 112 Rames RD, Barrack TN, Barrack RL, Nunley RM. Effect of Adductor Canal Block on Acute Perioperative Pain and Function in Total Knee Arthroplasty. *J Arthroplasty* 2019; **34**: S164-S7
- 113 Roberts C, Foster D, Shi GG, et al. A Collaborative Approach to Pain Control Reduces In-hospital Opioid Use and Improves Range of Motion following Total Knee Arthroplasty. *Cureus* 2019; **11**: e4678
- 114 Schmidt NR, Donofrio JA, England DA, McDonald LB, Motyka CL, Mileto LA. Extended-release epidural morphine vs continuous peripheral nerve block for management of postoperative pain after orthopedic knee surgery: a retrospective study. *AANA J* 2009; **77**: 349-54
- 115 Schwab PE, Yombi J, Lavand'homme P, Thienpont E. Comparison of local infiltration analgesia with single injection femoral nerve block in total knee arthroplasty. *Acta Orthop Belg* 2019; **85**: 122-9
- 116 Simonsen OH, Gorst-Rasmussen A, Simonsen AB, Jorgensen MB, Rathleff MS, Lundbye-Christensen S. Blood reinfusion combined with femoral nerve block in total knee replacement for patients with increased risk of bleeding. *Journal of orthopaedic surgery (Hong Kong)* 2011; **19**: 64-8
- 117 Singelyn FJ, Gouverneur JM. Postoperative analgesia after total hip arthroplasty: i.v. PCA with morphine, patient-controlled epidural analgesia, or continuous "3-in-1" block?: a prospective evaluation by our acute pain service in more than 1,300 patients. *J Clin Anesth* 1999; **11**: 550-4
- 118 Sporer SM, Rogers T. Postoperative Pain Management After Primary Total Knee Arthroplasty: The Value of Liposomal Bupivacaine. *The Journal of arthroplasty* 2016; **31**: 2603-7
- 119 Sugar SL, Hutson LR, Shannon P, Thomas LC, Nossaman BD. Comparison of extended-release epidural morphine with femoral nerve block to patient-controlled epidural analgesia for postoperative pain control of total knee arthroplasty: a case-controlled study. *The Ochsner journal* 2011; **11**: 17-21
- 120 Suthersan M, Pit S, Gordon L, Loman M, Pezzutti B, Freihaut R. Local infiltration analgesia versus standard analgesia in total knee arthroplasty. *Journal of orthopaedic surgery (Hong Kong)* 2015; **23**: 198-201
- 121 Tetsunaga T, Tetsunaga T, Fujiwara K, Endo H, Ozaki T. Combination Therapy with Continuous Three-in-One Femoral Nerve Block and Periarticular Multimodal Drug Infiltration after Total Hip Arthroplasty. *Pain Res Manag* 2016; **2016**: 1425201

122 Willett A, Lew R, Wardhan R. Is continuous proximal adductor canal analgesia with a periarticular injection comparable to continuous epidural analgesia for postoperative pain after Total Knee Arthroplasty? A retrospective study. *Romanian journal of anaesthesia and intensive care* 2019; **26**: 9-15