Airtraq[®] versus Macintosh laryngoscope for airway management during general anesthesia:

A systematic review and meta-analysis of randomized controlled trials

SUPPLEMENTARY DIGITAL CONTENT

Content:

SUPPLEMENTARY TABLE 1. INCLUSION AND EXCLUSION CRITERIA OF INCLUDED STUDIES.	2
SUPPL. FIG. 1. FOREST PLOT OF GENDER OF PARTICIPANTS (MALE) IN AIRTRAQ VS. MACINTOSH GROUPS.	8
SUPPL. FIG. 2. FOREST PLOT OF AGE IN AIRTRAQ VS. MACINTOSH GROUPS.	8
SUPPL. FIG. 3. FOREST PLOT OF WEIGHT [KG] IN AIRTRAQ VS. MACINTOSH GROUPS.	8
SUPPL. FIG. 4. FOREST PLOT OF HEIGHT [CM] IN AIRTRAQ VS. MACINTOSH GROUPS.	9
SUPPL. FIG. 5. FOREST PLOT OF THE AMERICAN SOCIETY OF ANESTHESIOLOGISTS PHYSICAL STATUS IN AIRTRAQ VS. MACINTOSH	
GROUPS	9
SUPPL. FIG. 6. FOREST PLOT OF GENDER OF MALLAMPATI CLASSIFICATION IN AIRTRAQ VS. MACINTOSH GROUPS	10
SUPPL. FIG. 7. FOREST PLOT OF THYROMENTAL DISTANCE IN AIRTRAQ VS. MACINTOSH GROUPS.	11
SUPPL. FIG. 8. FOREST PLOT OF INTER-INCISOR DISTANCE IN AIRTRAQ VS. MACINTOSH GROUPS.	11
SUPPL. FIG. 9. RISK OF BIAS GRAPH: REVIEW AUTHORS' JUDGEMENTS ABOUT EACH RISK OF BIAS ITEM PRESENTED AS PERCENTAG	ES
ACROSS ALL INCLUDED STUDIES.	11
SUPPL. FIG. 10. RISK OF BIAS SUMMARY: REVIEW AUTHORS' JUDGEMENTS ABOUT EACH RISK OF BIAS ITEM FOR EACH INCLUDED	
STUDY	12

Study	Inclusion criteria	Exclusion criteria	Outcome(s)	Findings
Abdallah et	18–60 years old, with the American	Patients with raised IOP or intracranial	intubation time, first-attempt	In comparison to the Macintosh
al. 2019	Society of Anesthesiologists physical	pressure, suspicion of difficult intubation,	success rate, time to best	laryngoscope, Airtraq conferred
	status class I or II, having no criteria for	need for rapid sequence induction,	laryngoscopic view, and	significantly better intubation
	suspected difficult intubation, scheduled	gastric acid aspiration risk, suspicion or	percentage of glottic opening	criteria and lesser stress
	for various types of nonophthalmic	history of difficult intubation, cervical	(POGO) score	response to laryngoscopy and
	elective surgery requiring orotracheal	spine pathology, body mass index \geq 35,		intubation.
	intubation.	cardiovascular, hyperreactive airway		
		disease, and/or on β-blocker therapy		
Al-Ghamdi	Patients aged 18 to 65 years, with an ASA	Patients with an anticipated or known	Time to tracheal intubation.	The Airtraq [®] require longer
et al. 2016	physical status classification of I to II,	difficult intubation such as history of	Secondary outcomes included	intubation times, as primary
	who were scheduled for elective surgery	cervical spine injury or surgery; limited	the laryngoscopic view,	outcome, and cause less sore
	and whose anesthesia plan included	neck mobility; previous oral or throat	numbers of laryngoscopy	throat than the Macintosh
	routine orotracheal intubation	surgery or difficult direct laryngoscopy; a	attempts, first-pass success	when used by anesthesiologists
		Body Mass index >35 kg/ m2; or missing	rate, optimization maneuvers,	with limited experience in
		Incisor teeth	ease of intubation, and	patients with normal alrways.
Dhandari at	ASA physical status Land II aga group 10	Castropsonhagool raflux disapso histus	Overall success rate of tracheal	Dath Airtrag and Magintach
briandari et	ASA physical status I and II, age group 16-	bornia and programery	intubation overall duration of	
al. 2015	injury psychiatric disorder respiratory		successful tracheal intubation	offective in tracheal intubation
	tract (oronbaryny, Jaryny) nathology		ontimization maneuvers POGO	in normal airways Duration of
	endocrine disorder, predicted difficult		score and ease of intubation	successful tracheal intubation
	airway (such as mouth opening < 2 cm			was shorter in the Airtrag group
	modified MPS class 3 and 4 BMI > 35			which was statistically
	kg/m^2 .			significant.
Chalkeidis et	ASA status I–III	(1) patients requesting regional	The time needed for intubation.	The Airtrag larvngoscope is
al. 2010		anesthesia; (2) the need for endotracheal	any assistance required,	easier to use but it does not
		tubes that are armored, cranial-facing or	complications during and after	have any significant advantages
		caudal-facing, or the need for a	laryngoscopy and intubation,	compared with the Macintosh
		nasotracheal tube, as indicated by the	and the number of unsuccessful	laryngoscope for routine airway
		type of surgery; (3) history of an	intubation attempts.	management.
		impossible or difficult intubation; (4)		
		emergency surgery.		

Supplementary Table 1. Inclusion and exclusion criteria of included studies.

Çolak et al. 2015	ASA status of I to III, and who were aged between 20 and 75	a history of emergency intubation or difficult intubation, a body mass index higher than 35 or a rheumatologic disease that causes limitation of cervical motion, a previous history of cervical operation or tumor, trauma or infection on upper airway, and the absence of teeth. Anthropometric measurements such as tiromental (thyroidea and gnathion) and sternomental (sternal and	The extension angle during intubation and the Cormack- Lehane Score	A minimal cervical motion was obtained during tracheal intubation with the use of Airtraq® laryngoscope compared with the Macintosh laryngoscope.
		(between the lower and upper incisor teeth), neck circumference (at the level of the thyroid cartilage), and lower face height (between gnathion and subnasale) were measured and recorded by an anatomist the night before the operation.		
Ertürk et al. 2015	ASA I-II, 18-65 years old	Pregnant women; patients with gastrooesophageal reflux, delayed gastric emptying; severe respiratory and cardiovascular problems; those who had intraoral, neck, pre-planned emergency, neck dissection, larynx and thyroid surgeries; those who had failed intubation despite three successful at- tempts and those who refused to be a part of this study	Patients' snoring complaints, modified Mallampati scores, sternomental distances, thyromental distances, interincisor distance measurements and Cormack- Lehane (C-L) laryngoscopic classification, upper lip bite test results, intubation time, number of intubation attempts, maneuvers and techniques used for facilitating intubation and complications arising from intubation	In cases with seemingly difficult intubations, we believe the Airtraq laryngoscope has an advantage over the Macintosh laryngoscope, owing to its better view of the oropharyngeal and glottic areas in addition to facilitating intubation in patients with limited head extension.
Ferrando et al. 2011	Patients scheduled for any kind of surgery who required tracheal intubation	Patients who could require rapid sequence induction, ASA physical status 4, age under 18 yr, and an interincisor distance less than 3 cm	The Cormack-Lehane score, the success rate at first intubation attempt, and the laryngoscopy and intubation times.	The Airtraq is a useful laryngoscope in unskillful anesthesiology residents improving the laryngeal view

				and, therefore, facilitating the tracheal intubation.
Hindman et al. 2014	(1) Mallampati airway class I or II, (2) thyromental distance of 6.0 cm or greater, and (3) sterno-mental distance of 12.5 cm or greater.; (4) age 18 to 80 yr, (6) height between 1.52 and 1.83 m, and (6) body mass index of 30.0 kg/m ² or less.	 (1) maxillary incisors that were loose or poor condition, (2) previous difficult intubation, (3) any cervical spine anatomic abnormalities such as disc disease, instability, myelopathy, and/or any previous cervical spine surgery, (4) symptomatic gastroesophageal reflux or reactive airway disease, (5) any his- tory of coronary artery disease or cerebral aneurysm, regard- less of symptom status, (6) any history of vocal cord and/or glottic disease or dysfunction, (7) preoperative systolic blood pressure greater than 180 mmHg or diastolic blood pressure greater than 80 mmHg, and (8) ASA physical status class greater than 3. 	(1) maximal laryngoscope force application, and (2) maximal overall (Oc-C5) cervical spine motion (extension).	Cervical spine motion is affected by the amount of force applied by the laryngoscope but shows that intubation biomechanics are nonlinear and differ markedly between laryngoscopes. Although intubation with the Airtraq required only 20% of the force required by the Macintosh (~10 vs. ~50 N), it resulted in 67% as much Oc-C5 motion (~20 vs. ~30 degrees).
Hosalli et al. 2017	ASA physical status I–II patients, aged 18–60 years, scheduled for various elective surgeries under general anaesthesia requiring tracheal intubation.	Patients with risk factors for difficult intubation (modified Mallampati class III and IV, thyromental distance <6 cm, interincisor distance <3 cm, body mass index more than 30 kg/m ²), risk for gastric aspiration, relevant drug allergy.	 (1) The difficulty of tracheal intubation based on intubation difficulty scale (IDS) score; (2) glottic view according to Cormack-Lehane grading; (3) number of optimization techniques (use of bougie, different size blade, stylet) (4) impact on haemodynamic variables such as heart rate (5) mean arterial blood pressure; (6) and oxygen saturation, which were recorded preintubation, 1, 3 and 5 min after intubation 	In patients undergoing endotracheal intubation with cervical immobilisation, Airtraq [™] laryngoscope was superior to the Macintosh laryngoscope, with greater ease of intubation and lower impact on haemodynamic variables.
Koh et al. 2010	Patients aged 20 to 60 years, with ASA physical status I-II who were scheduled	The risk factors for increased dental injury, pulmonary aspiration, functional or anatomical deformities in the airway	Intubation time, success rate of first intubation attempt, number of intubation attempts,	The Airtraq offers a better laryngeal view and higher success rate at first intubation

	to undergo surgical procedures necessitating tracheal intubation.	(i.e., asthma, burn, and tumor), anticipated airway difficulties (i.e., Mallampatti grade IV or having prior history of difficult airway), and body mass index greater than 30. Patients were also excluded if surgery required one lung ventilation or a different endotracheal tube other than the conventional endotracheal tube used.	and percentage of glottic opening (POGO) score.	attempt in patients who are applied with a Philadelphia cervical collar due to suspicion of cervical spine injury.
Maharaj et al. 2006	ASA physical status I–III patients, aged 18 years of age or older, scheduled for surgical procedures requiring tracheal intubation	Risk factors for gastric aspiration and / or risk factors for difficult intubation (Mallampatti class III or IV; thyromental distance less than 6 cm; interincisor distance less than 4.0 cm) were present or where there was a history of relevant drug allergy.	The duration of the tracheal intubation procedure and the intubation difficulty scale (IDS) score. A secondary endpoint was the rate of successful placement of the tracheal tube (ETT) in the trachea.	The Airtraq [®] laryngoscope offers a new approach for the management of the normal airway. The Airtraq [®] reduced the difficulty of tracheal intubation and the degree of haemodynamic stimulation compared to the Macintosh laryngoscope in patients at low risk for difficult laryngoscopy and intubation.
Maharaj et al. 2007	ASA physical status I–III, aged 18 yr or older, scheduled to undergo surgical procedures necessitating tracheal intubation.	Risk factors for gastric aspiration and/or difficult intubation (Mallampati class III or IV, thyromental distance less than 6 cm, interincisor distance less than 4.0 cm) were present, or where there was a history of relevant drug allergy.	The duration of the tracheal intubation procedure and the IDS score. A secondary endpoint was the rate of successful placement of the ETT in the trachea.	Authors demonstrate the utility of the Airtraq laryngoscope for tracheal intubation in patients with cervical spine immobilization.
Maharaj et al. 2008	ASA physical status 1–3 patients, aged 18 years of age or older, who were deemed on pre-operative assessment by their primary anesthetist to be at increased risk for difficult tracheal intubation and scheduled for surgical procedures requiring tracheal intubation. Inclusion criteria consisted of possession of at least three of the following criteria:	NS	The duration of the tracheal intubation procedure and the IDS score. A secondary endpoint was the rate of successful placement of the tracheal tube in the trachea.	Tracheal intubation with the Airtraq also reduced the degree of haemodynamic stimulation and minor trauma compared to the Macintosh laryngoscope.

	 (1) thyromental distance < 6 cm; (2) Mallampatti classification 3 or 4; (3) interincisor distance < 4 cm; (4) previously documented difficult intubation. 			
McElwain et al. 2011	ASA physical status I – III patients, aged 16 yr or older, undergoing surgical procedures requiring tracheal intubation.	Risk factors for gastric aspiration, difficult intubation, or both (Mallampati class III or IV; thyromental distance ,6 cm; inter- incisor distance ,3.5 cm) were present, or where there was a history of relevant drug allergy.	The intubation difficulty scale (IDS) score. Secondary endpoints were the duration of the laryngoscopy attempt, duration of the tracheal intubation procedure, the total time required to secure the airway, and the rate of successful placement of the TT in the trachea.	The Airtraq® laryngoscope performed better than the Macintosh laryngoscopes in patients undergoing cervical immobilization
Nishiyama 2011	ASA physical status I or II scheduled for general anesthesia aged 30 to 70 years.	History of surgery or any other diseases of neck and face.	Number of the attempts), and the time required for successful tracheal intubation.	The MAC and ATQ were better than the AWS-Miller for patients with easy intubation, while the ATQ was better than the MAC for difficult intubation when the expert anesthesiologists did the intubation.
Vijayakumar et al. 2016	Adult patients aged 18 to 60 years of either sex belonging to ASA 1 and 2, with normal airway parameters undergoing elective abdominal, urological, and gynecologic surgeries under general anesthesia requiring endotracheal intubation	Patients at risk for gastric aspiration, anticipated difficult airway (previous history/documented difficult intubation, interincisor distance of <3 cm, bucked tooth, Modified Mallampatti classification III/IV, thyromental distance of <6 cm, restricted neck extension, patient who cannot bring mandibular incisors anterior to maxillary incisors, any gross abnormality of head and neck, and obese with body mass index (BMI) ≥ 30kg/m2).	Successful intubation, and degree of difficulty of intubation as assessed by Intubation Difficulty Scale (IDS) score. Secondary outcomes compared were duration of laryngoscopy and intubation, degree of difficulty of intubation as assessed by Numerical Rating Scale score, soft tissue, and dental trauma.	In anesthetized adult patients with MILS compared with Macintosh, Airtraq provides equal success rate of in- tubation, statistically significant (although clinically insignif- icant) longer duration for laryngoscopy and intubation. Intubation with Airtraq was significantly easier than Macintosh as assessed by the IDS score.

Zhao et al.	ASA hysical status I to II patients, aged	A history or any indicator of a difficult	Success rate of intubation using	Airtraq laryngoscope is easier to
2014	between 18 and 65 years old, scheduled	airway (i.e. Mallampati grade >2, obesity	each laryngoscope. The number	master for novice personnel
	for surgical procedures requiring general	(body mass index >30 m/kg2), interincisor	of optimization maneuvers	with a higher intubation success
	anaesthesia and tracheal intubation.	distance less than 4 cm), or any risk	required to perform tracheal	rate and shorter intubation
		factor of pulmonary aspiration.	intubation. Dental trauma,	duration compared with the
			visible trauma to lip or oral	Macintosh laryngoscope.
			mucosa, and presence of blood	
			on laryngoscope blade were	
			also recorded.	

Legend: ASA = American Society of Anesthesiologists; NS = Not specified;

	ATC	2	MAG	2		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl	M–H, Fixed, 95% Cl
Abdallah 2019	19	35	22	35	8.7%	0.70 [0.27, 1.82]	
Al-Ghamdi 2016	10	21	8	22	3.5%	1.59 [0.47, 5.39]	
Bhandari 2013	14	40	10	40	5.6%	1.62 [0.61, 4.25]	
Ertürk 2015	25	40	26	40	8.4%	0.90 [0.36, 2.23]	
Hosalli 2017	13	30	11	30	5.4%	1.32 [0.47, 3.72]	
Koh 2010	9	25	9	25	5.0%	1.00 [0.32, 3.17]	
Maharaj 2006	11	30	11	30	6.0%	1.00 [0.35, 2.86]	
Maharaj 2007	8	20	9	20	4.7%	0.81 [0.23, 2.86]	
Maharaj 2008	8	20	10	20	5.2%	0.67 [0.19, 2.33]	
McElwain 2011	14	29	19	31	8.2%	0.59 [0.21, 1.64]	
Nishiyama 2011	20	36	19	35	7.4%	1.05 [0.41, 2.68]	
Vijayakumar 2016	14	45	15	45	8.9%	0.90 [0.37, 2.19]	
Zhao 2014	33	74	27	75	12.8%	1.43 [0.74, 2.76]	
Çolak 2015	23	46	25	49	10.4%	0.96 [0.43, 2.15]	
Total (95% CI)		491		497	100.0%	1.02 [0.79, 1.32]	•
Total events	221		221				
Heterogeneity: Chi ² =	5.06, df	= 13 (P = 0.97)	; $I^2 = 0$	%		
Test for overall effect	Z = 0.19	$\Theta (P = C)$).85)				

Suppl. Fig. 1. Forest plot of gender of participants (male) in Airtraq vs. Macintosh groups.

		ATQ			МАС			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% Cl
Abdallah 2019	40.43	9.93	35	41.62	5.22	35	16.6%	-1.19 [-4.91, 2.53]	
Al-Ghamdi 2016	34.5	10.43	21	31.4	8.96	22	6.8%	3.10 [-2.72, 8.92]	
Bhandari 2013	38.3	16.51	40	38.97	13.68	40	5.2%	-0.67 [-7.31, 5.97]	
Chalkeidis 2010	36.4	16.4	35	38.5	17.2	28	3.3%	-2.10 [-10.47, 6.27]	
Ertürk 2015	38.5	15	40	40.4	13.7	40	5.8%	-1.90 [-8.20, 4.40]	
Hosalli 2017	33.37	12.07	30	37.37	11.32	30	6.5%	-4.00 [-9.92, 1.92]	
Koh 2010	45.5	7.9	25	44	9.4	25	9.9%	1.50 [-3.31, 6.31]	
Maharaj 2006	43.8	16.8	30	41.1	16.9	30	3.2%	2.70 [-5.83, 11.23]	
Maharaj 2007	43.6	19.4	20	45.7	16.4	20	1.8%	-2.10 [-13.23, 9.03]	
Maharaj 2008	51.7	14.6	20	50.2	18.2	20	2.2%	1.50 [-8.73, 11.73]	
McElwain 2011	52	19	29	58	20	31	2.4%	-6.00 [-15.87, 3.87]	·
Nishiyama 2011	57.9	9.9	38	54.3	8.5	35	12.8%	3.60 [-0.62, 7.82]	+
Vijayakumar 2016	35.88	11.25	45	34.17	10.66	45	11.2%	1.71 [-2.82, 6.24]	
Zhao 2014	48	18	74	49	17	75	7.2%	-1.00 [-6.62, 4.62]	
Çolak 2015	47.7	16.86	46	49.69	16.04	49	5.2%	-1.99 [-8.62, 4.64]	
Total (95% CI)			528			525	100.0%	0.10 [-1.41, 1.61]	•
Heterogeneity: Chi ² =	10.05,	df = 14	(P = 0.	.76); I ² =	= 0%				
Test for overall effect	Z = 0.1	13 (P =	0.90)						Favours [ATQ] Favours [MAC]

Suppl. Fig. 2. Forest plot of age in Airtraq vs. Macintosh groups.

		ATQ			МАС			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Abdallah 2019	69.5	13.18	35	68.15	11.11	35	5.3%	1.35 [-4.36, 7.06]	
Al-Ghamdi 2016	74.5	10.2	21	74.6	7.84	22	5.8%	-0.10 [-5.56, 5.36]	
Bhandari 2013	51.17	7.95	40	51.75	6.49	40	17.0%	-0.58 [-3.76, 2.60]	
Chalkeidis 2010	82.5	17.3	35	80.6	14.8	28	2.7%	1.90 [-6.03, 9.83]	
Koh 2010	64.9	9.3	25	61.8	10.6	25	5.6%	3.10 [-2.43, 8.63]	
Maharaj 2006	71.7	11.3	30	73.8	9.8	30	6.0%	-2.10 [-7.45, 3.25]	
Nishiyama 2011	63.7	8.5	36	61.1	8.1	35	11.5%	2.60 [-1.26, 6.46]	
Vijayakumar 2016	57.7	8.13	45	56.84	8.27	45	15.0%	0.86 [-2.53, 4.25]	
Zhao 2014	63.8	8.2	74	60.8	8.1	75	25.1%	3.00 [0.38, 5.62]	
Çolak 2015	72.3	11.23	46	76.02	15.33	49	5.9%	-3.72 [-9.10, 1.66]	
Total (95% CI)			387			384	100.0%	1.03 [-0.28, 2.34]	
Heterogeneity: Chi ² =	8.87, d	f = 9 (P	= 0.45); $I^2 = 0$)%				
Test for overall effect	: Z = 1.5	54 (P =	0.12)						-10 -5 0 5 10 Favours [ATQ] Favours [MAC]



	A	ΑTQ		P	AC			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	CI IV, Fixed, 95% CI
Abdallah 2019	164.26	5.63	35	165.54	4.42	35	20.8%	-1.28 [-3.65, 1.09])]
Al-Ghamdi 2016	165.7	6.61	21	164.6	7.4	22	6.7%	1.10 [-3.09, 5.29])]
Bhandari 2013	156.37	6.52	40	155.65	5.31	40	17.2%	0.72 [-1.89, 3.33]	3]
Chalkeidis 2010	175	9	35	172	8	28	6.6%	3.00 [-1.20, 7.20])]
Koh 2010	165.2	7.8	25	160.9	8.6	25	5.6%	4.30 [-0.25, 8.85]	j]
Nishiyama 2011	164.5	9.3	36	161.5	7	35	8.0%	3.00 [-0.82, 6.82]	2]
Zhao 2014	164.9	7.6	74	165	5.8	75	24.8%	-0.10 [-2.27, 2.07]	7]
Çolak 2015	170.85	8.18	46	170.98	8.55	49	10.3%	-0.13 [-3.49, 3.23]	3]
Total (95% CI)			312			309	100.0%	0.57 [-0.51, 1.66]	5]
Heterogeneity: Chi ² =	8.36, df	= 7 (P	= 0.30); $ ^2 = 16$	5%				
Test for overall effect	: Z = 1.04	+ (P =	0.30)						Favours [ATQ] Favours [MAC]

Suppl. Fig. 4. Forest plot of height [cm] in Airtraq vs. Macintosh groups.

	ATC	2	MA	с		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% Cl
1.5.1 I							
Abdallah 2019	23	35	22	35	6.5%	1.13 [0.43, 3.01]	_
Al-Ghamdi 2016	8	21	7	22	3.6%	1.32 [0.38, 4.64]	
Bhandari 2013	27	40	28	40	7.8%	0.89 [0.35, 2.29]	
Ertürk 2015	33	40	31	40	4.7%	1.37 [0.45, 4.12]	
Hosalli 2017	18	30	16	30	5.5%	1.31 [0.47, 3.65]	
Koh 2010	22	25	18	25	1.9%	2.85 [0.64, 12.64]	
Vijayakumar 2016	45	45	44	45	0.4%	3.07 [0.12, 77.32]	
Zhao 2014	42	74	48	75	17.7%	0.74 [0.38, 1.43]	
Subtotal (95% CI)		310		312	48.0%	1.09 [0.76, 1.56]	•
Total events	218		214				
Heterogeneity: Chi ² =	: 3.90, df	= 7 (P)	= 0.79);	$I^2 = 0\%$)		
Test for overall effect	Z = 0.46	6 (P = 0).65)				
1.5.2 II							
Abdallah 2019	12	35	13	35	7.3%	0.88 [0.33, 2.35]	
Al-Ghamdi 2016	13	21	15	22	4.8%	0.76 [0.22, 2.67]	
Bhandari 2013	14	40	12	40	6.7%	1.26 [0.49, 3.21]	
Ertürk 2015	7	40	9	40	6.4%	0.73 [0.24, 2.20]	
Hosalli 2017	12	30	14	30	7.2%	0.76 [0.27, 2.12]	
Koh 2010	3	25	7	25	5.3%	0.35 [0.08, 1.55]	
Vijayakumar 2016	0	45	1	45	1.3%	0.33 [0.01, 8.22]	
Zhao 2014	32	74	27	75	13.1%	1.35 [0.70, 2.62]	- +
Subtotal (95% CI)		310		312	52.0%	0.93 [0.65, 1.34]	
Total events	93		98				
Heterogeneity: Chi ² =	4.14, df	= 7 (P)	= 0.76);	$I^2 = 0\%$	5		
Test for overall effect	: Z = 0.30	5 (P = 0).72)				
Total (95% CI)		620		624	100.0%	1.01 [0.78, 1.30]	•
Total events	311		312				
Heterogeneity: Chi ² =	8.30, df	= 15 (P = 0.91); $I^2 = 0$	%		
Test for overall effect	: Z = 0.0	7 (P = 0).95)				U.UI U.I I 10 100
Test for subgroup dif	ferences	$Chi^2 =$	0.34. df	= 1 (P)	= 0.56).	$^{2} = 0\%$	ravours [ATQ] ravours [MAC]

Suppl. Fig. 5. Forest plot of the American Society of Anesthesiologists physical status in Airtraq vs. Macintosh groups.

	ATC	2	MAC Odds Ratio				Odds Ratio				
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M–H, Fixed, 95% Cl				
1.6.1 1											
Al-Ghamdi 2016	11	21	13	22	2.7%	0.76 [0.23, 2.54]					
Bhandari 2013	25	40	22	40	3.6%	1.36 [0.56, 3.33]					
Chalkeidis 2010	19	35	13	28	2.9%	1.37 [0.51, 3.71]					
Ertürk 2015	16	40	19	40	5.0%	0.74 [0.30, 1.79]					
Hosalli 2017	9	30	8	30	2.5%	1.18 [0.38, 3.63]					
Koh 2010	4	25	6	25	2.2%	0.60 [0.15, 2.47]					
Maharai 2006	13	30	17	30	4.3%	0.58 [0.21, 1.62]					
Maharaj 2007	12	20	13	20	2.3%	0.81 [0.22, 2.91]					
Maharai 2008		20		20	0.2%	3 15 [0 12 82 16]					
McFlwain 2011	13	29	12	31	2.8%	1 29 [0 46 3 60]					
Vijavakumar 2016	8	45	9	45	3 3%	0.86[0.30, 2.49]					
Zhao 2014	52	74	56	75	7 3%	0.80 [0.39, 1.65]					
Colak 2015	15	46	20	49	5.8%	0.70 [0.30, 1.62]					
Subtotal (95% CI)	15	455	20	455	44.9%	0.90 [0.68, 1.19]	▲				
Total ovents	108	155	208		1 11370	0150 [0100, 1115]	•				
Hotorogonoity Chi ² -	1 EO df	_ 12 /	200	12 - 6	0/						
Test for everall offerty	4.50, ui	= 12 (F	r = 0.97	\mathbf{y} , $\mathbf{r} = \mathbf{c}$	70						
Test for overall effect:	Z = 0.72	P = 0	.46)								
1 ())											
1.0.2 2											
Al-Ghamdi 2016	10	21	9	22	2.0%	1.31 [0.39, 4.39]					
Bhandari 2013	15	40	18	40	5.0%	0.73 [0.30, 1.79]					
Chalkeidis 2010	6	35	9	28	3.7%	0.44 [0.13, 1.43]					
Ertürk 2015	13	40	15	40	4.5%	0.80 [0.32, 2.01]					
Hosalli 2017	21	30	22	30	2.9%	0.85 [0.28, 2.61]					
Koh 2010	16	25	15	25	2.4%	1.19 [0.38, 3.72]					
Maharaj 2006	17	30	13	30	2.5%	1.71 [0.62, 4.75]					
Maharaj 2007	8	20	7	20	1.9%	1.24 [0.34, 4.46]					
Maharaj 2008	2	20	1	20	0.4%	2.11 [0.18, 25.35]					
McElwain 2011	16	29	18	31	3.4%	0.89 [0.32, 2.47]					
Vijayakumar 2016	37	45	36	45	2.8%	1.16 [0.40, 3.33]					
Zhao 2014	22	74	19	75	5.9%	1.25 [0.61, 2.56]					
Çolak 2015	27	46	17	49	3.0%	2.67 [1.17, 6.14]					
Śubtotal (95% CI)		455		455	40.3%	1.14 [0.86, 1.51]	◆				
Total events	210		199								
Heterogeneity: $Chi^2 = 9.53$, df = 12 (P = 0.66); $I^2 = 0\%$											
Test for overall effect: $Z = 0.90$ (P = 0.37)											
			,								
1.6.3 3											
Chalkeidis 2010	10	35	5	28	1 8%	1 84 [0 55 6 19]					
Ertürk 2015	8	40	5	40	1.8%	1 75 [0 52 5 90]					
Koh 2010	5	25	4	25	1 4%	1 31 [0 31 5 60]					
Maharai 2008	13	20	15	20	2 3%	0.62 [0.16, 2.43]					
Colak 2015	13	46	11	49	4 3%	0.33 [0.10, 1.12]					
Subtotal (95% CI)	4	166	11	162	11.6%	0.95 [0.55, 1.65]					
Total overts	40	100	40	101	1110/0	0000 [0100] 1000]	•				
Hotorogonoity: Chi ² –	40 5 5 5 df	- 4 (D	40	12 - 20	0/						
Test for overall effects	7 = 0.17	= 4 (r 7 (p _ 0	= 0.24),	1 = 20	70						
rest for overall effect.	Z = 0.17	P = 0	.07)								
1644											
	0	25	1	2.0	0.70/						
Chalkeidis 2010	0	35	1	28	0.7%	0.26 [0.01, 6.59]					
Erturk 2015	3	40	1	40	0.4%	3.16 [0.31, 31.78]					
Maharaj 2008	4	20	4	20	1.4%	1.00 [0.21, 4.71]					
Çolak 2015	0	46	1	49	0.6%	0.35 [0.01, 8.75]					
Subtotal (95% CI)		141		137	3.2%	0.98 [0.35, 2.76]					
Total events	7		7								
Heterogeneity: $Chi^2 =$	2.04, df	= 3 (P	= 0.56);	$l^2 = 0$ %	6						
Test for overall effect:	Z = 0.04	1 (P = 0)	.97)								
							ļ				
Total (95% CI)		1217		1209	100.0%	1.00 [0.84, 1.21]	•				
Total events	455		454								
Heterogeneity: Chi ² =	22.97, d	f = 34	(P = 0.9)	2); I ² =	0%						
Test for overall effect:	Z = 0.04	(P = 0)	.97)								
Test for subgroup diff	erences:	Chi ² =	1.39, df	= 3 (P	= 0.71), I	$1^2 = 0\%$					

Suppl. Fig. 6. Forest plot of gender of Mallampati classification in Airtraq vs. Macintosh groups.

	ATQ M			MAC			Mean Difference	Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% Cl	
Al-Ghamdi 2016	7.2	1.1	21	6.6	0.81	22	1.6%	0.60 [0.02, 1.18]		
Bhandari 2013	7.42	0.21	40	7.39	0.23	40	57.2%	0.03 [-0.07, 0.13]	#	
Ertürk 2015	8.3	1.5	40	8.7	1.4	40	1.3%	-0.40 [-1.04, 0.24]		
Hosalli 2017	6.96	0.32	30	6.82	0.28	30	23.0%	0.14 [-0.01, 0.29]		
Koh 2010	5.9	0.5	25	6.3	0.7	25	4.7%	-0.40 [-0.74, -0.06]		
Maharaj 2006	6.7	0.7	30	6.9	0.7	30	4.2%	-0.20 [-0.55, 0.15]	—- -	
Maharaj 2007	6.4	0.4	20	6.5	0.6	20	5.3%	-0.10 [-0.42, 0.22]		
McElwain 2011	8.2	1.2	29	8.1	1.2	31	1.4%	0.10 [-0.51, 0.71]		
Çolak 2015	9.696	1.748	46	9.918	1.496	49	1.2%	-0.22 [-0.88, 0.43]		
Total (95% CI)			281			287	100.0%	0.02 [-0.05, 0.09]	•	
Heterogeneity: $Chi^2 = 16.54$, $df = 8 (P = 0.04)$; $l^2 = 52\%$										
Test for overall effect: $Z = 0.53$ (P = 0.60) Favours [ATQ] Favours [

Suppl. Fig. 7. Forest plot of Thyromental distance in Airtraq vs. Macintosh groups.

		ATQ			МАС			Mean Difference	Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI		
Al-Ghamdi 2016	4.9	1.31	21	4.5	1.1	22	1.0%	0.40 [-0.32, 1.12]			
Bhandari 2013	4.4	0.207	40	4.37	0.25	40	53.0%	0.03 [-0.07, 0.13]	+		
Ertürk 2015	5.3	0.9	40	5.5	0.9	40	3.4%	-0.20 [-0.59, 0.19]			
Hosalli 2017	3.7	0.42	30	3.64	0.27	30	16.8%	0.06 [-0.12, 0.24]			
Maharaj 2006	4.3	0.7	30	4.5	0.8	30	3.7%	-0.20 [-0.58, 0.18]			
Maharaj 2007	4.6	0.6	20	4.8	0.7	20	3.3%	-0.20 [-0.60, 0.20]			
McElwain 2011	4.5	0.8	29	4.3	0.9	31	2.9%	0.20 [-0.23, 0.63]			
Çolak 2015	3.243	0.336	46	3.167	0.556	49	15.9%	0.08 [-0.11, 0.26]	+-		
Total (95% CI)			256			262	100.0%	0.03 [-0.05, 0.10]	•		
Heterogeneity: $Chi^2 = 5.90$, df = 7 (P = 0.55); $l^2 = 0\%$											
Test for overall effect: Z = 0.72 (P = 0.47)											

Suppl. Fig. 8. Forest plot of Inter-incisor distance in Airtraq vs. Macintosh groups.



Suppl. Fig. 9. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



Suppl. Fig. 10. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.